

LEGEND

- ⊕ SOIL BORING COMPLETED AS A TEMPORARY MONITORING WELL (LTE)
- ⊗ EXISTING MONITORING WELL (SEM)
- ▲ FORMER MONITORING WELL (WALSH/URS/SEM)
- ▲ FORMER SOIL BORING AND/OR CONCRETE CORE (SEM)
- FORMER SOIL BORING COMPLETED AS A MONITORING WELL (URS)
- PROPERTY BOUNDARY
- x — x FENCE
- LTE: LT ENVIRONMENTAL, INC.
- SEM: STRATEGIC ENVIRONMENTAL MANAGEMENT, LLC
- URS: URS CORPORATION
- WALSH: WALSH ENVIRONMENTAL SCIENTISTS AND ENGINEERS, LLC

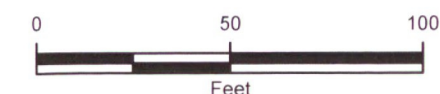
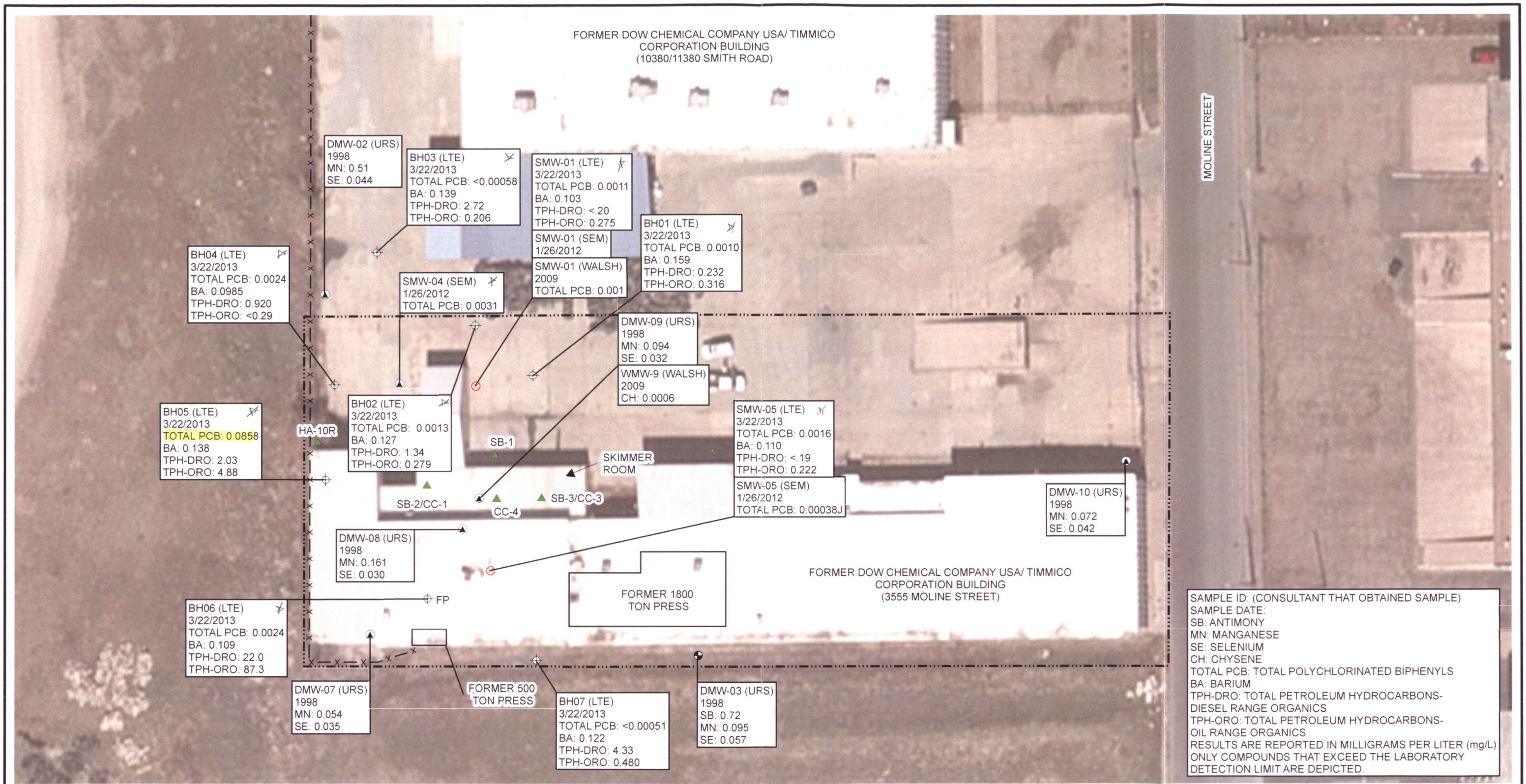


FIGURE 4
SOIL AND CONCRETE DATA
3555 MOLINE STREET
AURORA, COLORADO

HI-TEC PLASTICS, INC.

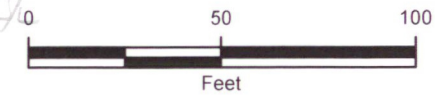




LEGEND

- | | | |
|--|-----------------------|--|
| ⊕ SOIL BORING COMPLETED AS A TEMPORARY MONITORING WELL (LTE) | --- PROPERTY BOUNDARY | LTE: LT ENVIRONMENTAL, INC. |
| ⊗ EXISTING MONITORING WELL (SEM) | x — x FENCE | SEM: STRATEGIC ENVIRONMENTAL MANAGEMENT, LLC |
| ▲ FORMER MONITORING WELL (WALSH/URS/SEM) | FP: FLOATING PRODUCT | URS: URS CORPORATION |
| ▲ FORMER SOIL BORING AND/OR CONCRETE CORE (SEM) | | WALSH: WALSH ENVIRONMENTAL SCIENTISTS AND ENGINEERS, LLC |
| ● FORMER SOIL BORING COMPLETED AS A MONITORING WELL (URS) | | |

MCL FOR PCBs = 0.0005 mg/L



SAMPLE ID: (CONSULTANT THAT OBTAINED SAMPLE)
SAMPLE DATE:
SB: ANTIMONY
MN: MANGANESE
SE: SELENIUM
CH: CHYSENE
TOTAL PCB: TOTAL POLYCHLORINATED BIPHENYLS
BA: BARIUM
TPH-DRO: TOTAL PETROLEUM HYDROCARBONS-
DIESEL RANGE ORGANICS
TPH-ORO: TOTAL PETROLEUM HYDROCARBONS-
OIL RANGE ORGANICS
RESULTS ARE REPORTED IN MILLIGRAMS PER LITER (mg/L)
ONLY COMPOUNDS THAT EXCEED THE LABORATORY
DETECTION LIMIT ARE DEPICTED.

FIGURE 5
GROUNDWATER DATA
3555 MOLINE STREET
AURORA, COLORADO

HI-TEC PLASTICS, INC.



TABLES

TABLE 1
ANALYTICAL DATA - SOIL
MARCH 2013
HI-TEC PLASTICS, INC.
3555 MOLINE STREET, AURORA COLORADO

SAMPLE ID	SAMPLE DATE	TOTAL PCBs (mg/kg)	ARSENIC (mg/kg)	BARIUM (mg/kg)	CADMIUM (mg/kg)	CHROMIUM III/ CHROMIUM VI (mg/kg)	LEAD (mg/kg)	MERCURY (mg/kg)	SELENIUM (mg/kg)	SILVER (mg/kg)	TPH DRO (mg/kg)	TPH ORO (mg/kg)
BH01 15' - 17'	3/18/2013	0.0628	<2.6	65.9	<1.0	4.7	<5.2	<0.087	5.2	<3.1	<7.2	8.01
BH02 15' - 17'	3/18/2013	0.0366	<2.6	60.1	<1.0	3.4	<5.2	<0.87	<5.2	<3.1	<7.2	<11
BH03 15' - 17'	3/18/2013	<0.018	<2.7	122	<1.1	3.4	6.1	<0.088	<5.4	<3.2	<7.1	<11
BH04 16' - 17.5'	3/18/2013	<0.018	<2.7	122	<1.1	3.4	6.1	<0.088	<5.4	<3.2	<7.2	<11
BH05 2' - 5'	3/18/2013	762	<2.8	128	<1.1	8.1	9.9	<0.095	<5.7	<3.4	134	476
BH06 16' - 17.5'	3/18/2013	0.242	<2.8	85.6	<1.1	2.0	<5.6	<0.098	<5.6	<3.4	938	3,730
BH07 14' - 16'	3/18/2013	<0.0057	<2.9	33.1	<1.2	3.0	<5.8	<0.090	<5.8	<3.5	<7.6	19.3
EPA Regional Screening Levels (Residential)		0.22	0.39	15,000	70	120,000/0.29	400	10	390	390	NPS	
EPA Regional Screening Levels (Industrial)		0.74	1.6	190,000	800	1,500,000/5.6	800	43	5,100	5,100	NPS	

Notes:

mg/kg - milligrams per kilogram

TPH - Total petroleum hydrocarbons

DRO - Diesel range organics

ORO - Oil range organics

PCBs - Polychlorinated biphenyls

NPS - No published standard

< - less than laboratory detection limit

Bold indicates result exceeds the applicable standard



TABLE 2
ANALYTICAL DATA- GROUNDWATER
MARCH 2013
HI-TEC PLASTICS, INC.
3555 MOLINE STREET, AURORA COLORADO

SAMPLE ID	SAMPLE DATE	TOTAL PCBs (mg/l)	ARSENIC (mg/l)	BARIUM (mg/l)	CADMIUM (mg/l)	CHROMIUM III/ CHROMIUM VI (mg/l)	LEAD (mg/l)	MERCURY (mg/l)	SELENIUM (mg/l)	SILVER (mg/l)	TPH DRO (mg/l)	TPH ORO (mg/l)
BH01	3/22/2013	0.0010	< 0.13	0.159	<0.01	< 0.01	<0.050	<0.0001	< 0.050	<0.030	0.232	0.316
BH02	3/22/2013	0.0013	< 0.13	0.127	<0.01	< 0.01	<0.050	<0.0001	< 0.050	<0.030	1.34	0.279
BH03	3/22/2013	< 0.00058	< 0.13	0.139	<0.01	< 0.01	<0.050	<0.0001	< 0.050	<0.030	2.72	0.206
BH04	3/22/2013	0.0024	< 0.13	0.0985	<0.01	< 0.01	<0.050	<0.0001	< 0.050	<0.030	0.920	<0.29
BH05	3/22/2013	0.0858	< 0.13	0.138	<0.01	< 0.01	<0.050	<0.0001	< 0.050	<0.030	2.03	4.88
BH06	3/22/2013	0.0024	< 0.13	0.109	<0.01	< 0.01	<0.050	<0.0001	< 0.050	<0.030	22.0	87.3
BH07	3/22/2013	< 0.00051	< 0.13	0.122	<0.01	< 0.01	<0.050	<0.0001	< 0.050	<0.030	4.33	0.480
SMW-01	3/22/2013	0.0011	< 0.13	0.103	<0.01	< 0.01	<0.050	<0.0001	< 0.050	<0.030	<0.20	0.275
SMW-05	3/22/2013	0.0016	< 0.13	0.110	<0.01	< 0.01	<0.050	<0.0001	< 0.050	<0.030	<0.19	0.222
CDPHE-CSEV Water Standard		0.000017	0.01	2.0	0.005	0.1/0.0007	0.05	0.002	0.02	0.05	NPS	

Notes:

CDPHE - CSEV - Colorado Department of Public Health and Environment Colorado Soil Evaluation Value

mg/l - milligrams per liter

TPH - Total petroleum hydrocarbons

DRO - Diesel range organics

ORO - Oil range organics

PCB - Polychlorinated biphenyls

< - less than laboratory detection limit

Bold indicates the result exceeds the applicable standard

NPA - No published standard.

ATTACHMENT 1
PREVIOUSLY GENERATED REPORTS
(CD-ROM)



STATE OF COLORADO

Bill Owens, Governor
Jane E. Norton, Executive Director

Dedicated to protecting and improving the health and environment of the people of Colorado

HAZARDOUS MATERIALS AND WASTE MANAGEMENT DIVISION

<http://www.cdphe.state.co.us/hmw/>

4300 Cherry Creek Dr. S.
Denver, Colorado 80246-1530
Phone (303) 692-3300
Fax (303) 759-5355

222 S. 6th Street, Room 232
Grand Junction, Colorado 81501-2768
Phone (970) 248-7164
Fax (970) 248-7198



Colorado Department
of Public Health
and Environment

*Warren,
Copied Bruce
5/18/99*

May 10, 1999

Tim Sand
Nationwide Magazine
3680 E. 52nd Avenue
Denver, CO 80216

Re: Closure and No Further Action Determination for Old Landfill Property,
11600 Smith Road, Aurora, Colorado

Dear Mr. Sand:

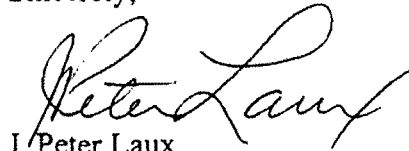
The Hazardous Materials and Waste Management Division of the Department of Public Health and Environment (the Division) has reviewed the report entitled "Limited Phase II Environmental Site Assessment, 11600 Smith Road, Aurora, Colorado" dated May 4, 1999, prepared for you by Paragon Consulting Group. The report recaps previous assessments and investigations at the site and provides new information on the landfill material from 10 test pits, and results of soil, gas, and ground water sampling. Household trash, mixed with large amounts of soil and construction debris, was found at depths of 2.5 to 10 feet. Minor amounts of petroleum and volatile organic compounds were noted and methane (16% to 35% LEL) was recovered from three monitoring probes.

Based on the information provided, the apparent lack of contamination of concern and indications that the landfill materials are covered with at least two feet of soil, the Division concurs with the recommendation to consider this landfill closed and requires no further action. Further, we concur with recommendations regarding site development listed in Section 7 of the report, and enclose our list of concerns and recommendations for construction activities at former landfill sites.

Tim Sand, Nationwide Magazine
May 10, 1999
Page Two

Should you have any questions, I may be reached at (303) 692-3455.

Sincerely,

A handwritten signature in black ink, appearing to read "Peter Laux", written in a cursive style.

J. Peter Laux
Geologist
Solid Waste Unit
Compliance Program

Enclosure

cc: David Rau/Brick Smith, Paragon
Warren Brown, Tri-County Health
Jim Ives, City of Aurora

File SW/ADM/116 - 4E

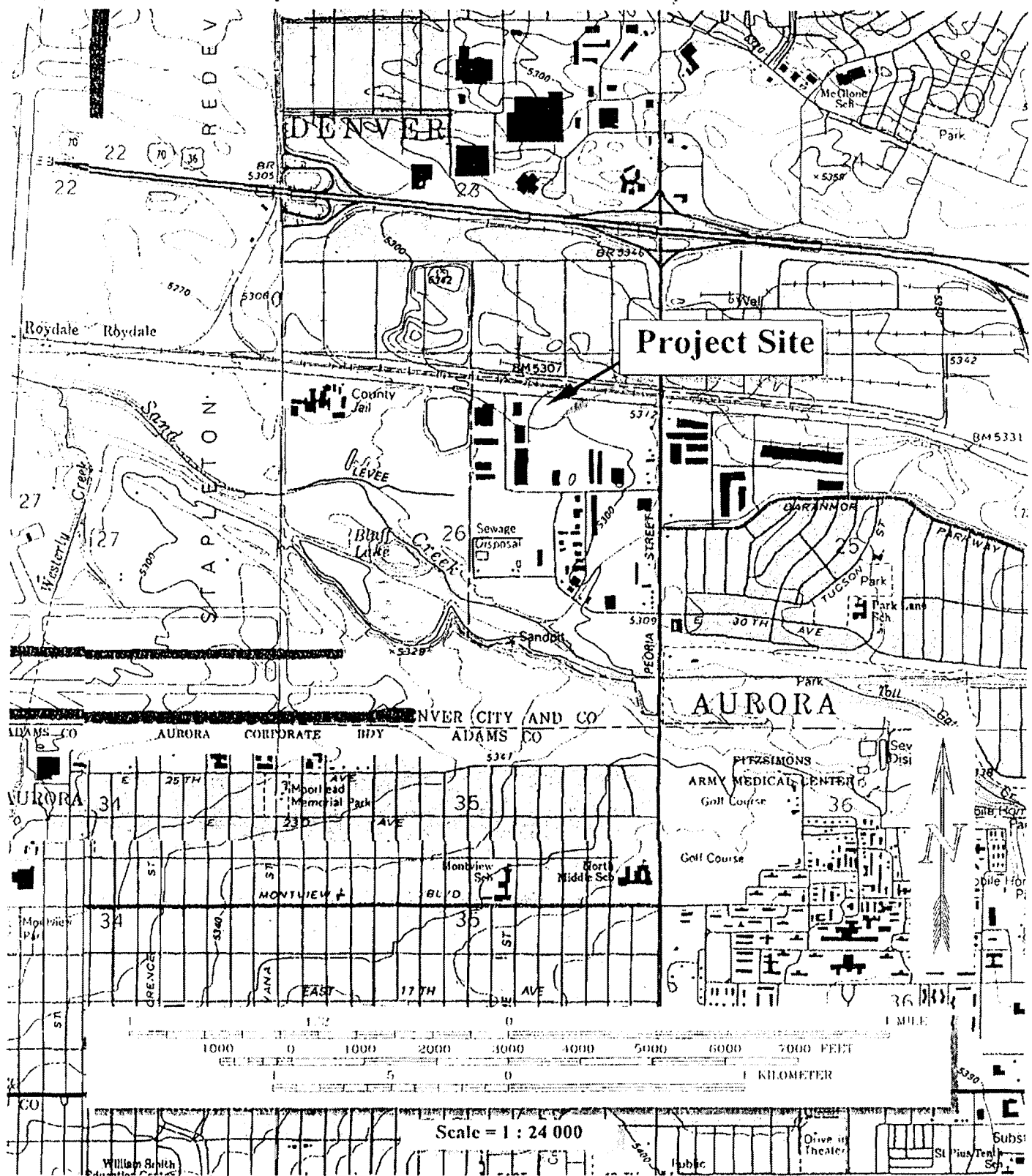


Figure 2 Vicinity Map
 Nationwide Magazine Property
 11600 Smith Road, Aurora, Colorado
 Project No. 2097017 August 1998 Drawn by PJH(17fig2)

PARAGON

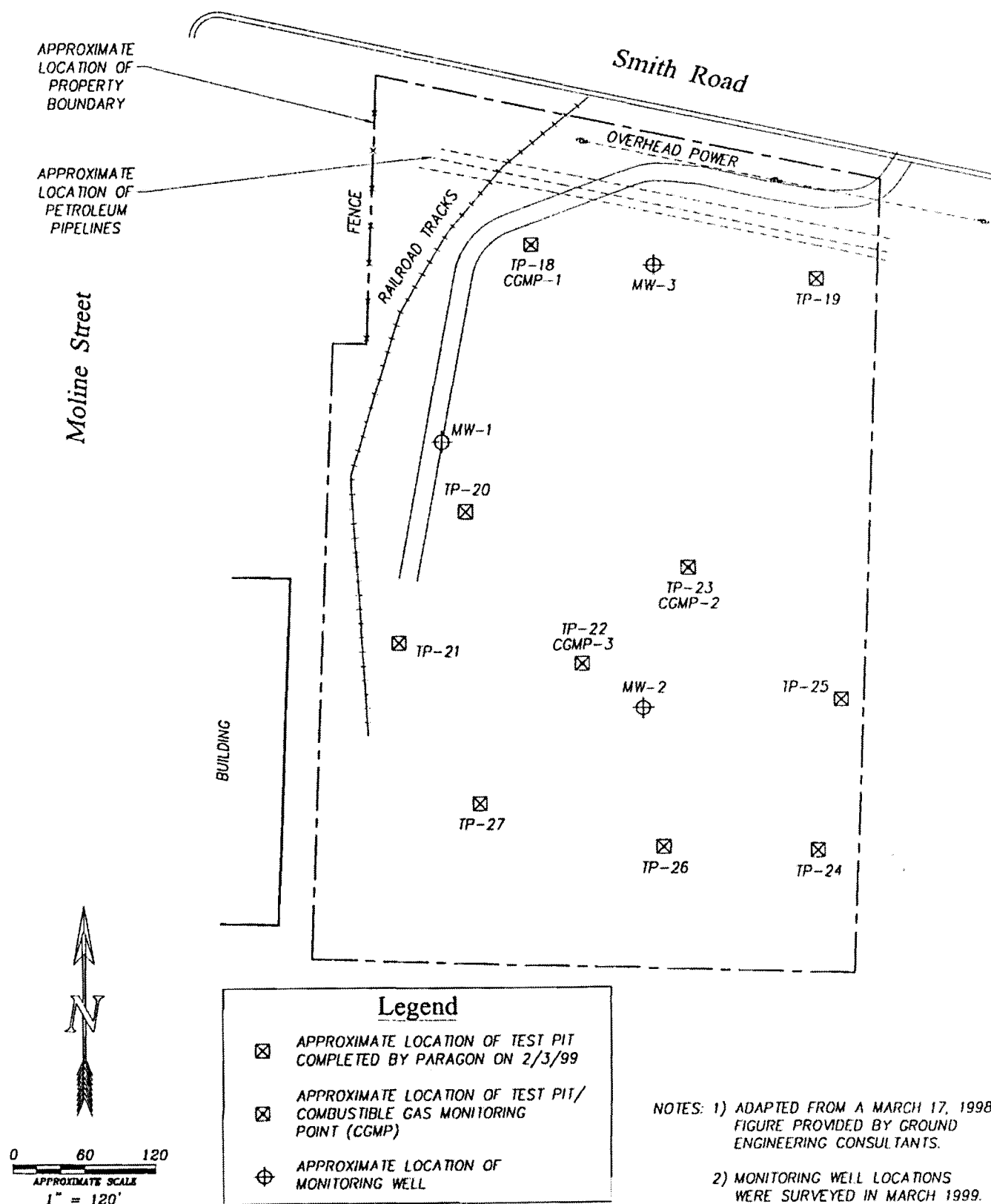


Figure 3 Test Pits and Monitoring Wells Location Diagram
Nationwide Magazine Property, 11600 Smith Road, Aurora, Colorado

Project No. 2098017 April 1999 Drawn by PJH(17sld4)

PARAGON

City of Aurora, Colorado
PRE-APPLICATION MEETING NOTES
Environmental Comments

Applicant: Transit Mix Concrete
Project: Concrete Batch Plant
Location: 11600 Smith Road
Comments prepared by: Jim Ives, C.E.P., Environmental Coordinator
Phone: 303-739-7220
Pre-app Meeting Date: April 13, 2000

Environmental Background

This site of approximately 8 acres was used for landfilling activities during the period 1958 to 1960. Significant amounts of soil and construction debris appear to have been intermixed with household solid waste and placed in the northern and central portions of the site. Phase I and a limited Phase II environmental site assessments have been conducted at the site. These site assessments indicated that the trash zone has a thickness ranging from about ½ foot to 6 feet. The bottom of this trash zone varies between 3 feet and 10 feet below ground surface (bgs). Groundwater on the site appears to be at a depth of 17 feet to 23 feet bgs. Methane gas generation was documented during the assessments; however, significant leaching of contaminants into groundwater does not appear to have occurred. This may be due to the fact that the observed trash zone is 9 feet to 14 feet above the groundwater level. The landfill materials appear to be covered with at least 2 foot of soil. (Refer to attached drawing.) On May 10, 1999, the Hazardous Materials and Waste Management Division of the Colorado Department of Public Health and Environment (CDPHE) issued a Closure and No Further Action Determination for the landfill. (Copy attached.) This determination is contingent on the integrity of the final cover and the containment of the waste material. Activity, including site construction, should not disturb this integrity or increase the potential threat to human health or the environment. Disturbing the cover can allow infiltration of water and result in increased landfill gas generation and leachate production.

Environmental Issues with Site

❖ **Plans and specifications of measures that will be implemented to ensure the health and safety of workers during site construction.**

Worker safety and health protection should be addressed in a comprehensive Health and Safety (H&S) Plan that includes monitoring for hazards such as combustible gas, low oxygen, contamination, instability, etc. The plan should specify actions and procedures should hazards be encountered, and provide for training for such situations. This H&S Plan should be submitted to the City's Environmental Coordinator, the CDPHE and the Tri-County Health Department for review and concurrence. **Resource Contacts:** Hazardous Material and Waste Management Division, CDPHE, Peter Laux, 303-692-3455; and Tri-County Health Department, Warren Brown, 303-846-6225.

❖ **Identification of proposed engineering controls to prevent the migration and accumulation of methane in utility lines or any structures that are planned for construction over the fill or fill-affected areas of the site.** An analysis of the nature and extent, if any, of the potential hazard posed by trapped accumulation of methane gas associated with the closed landfill should be part of the development of the engineering controls. These control measures should be submitted to the City's Environmental Coordinator, the CDPHE and the Tri-County Health Department for review and concurrence.

**LIMITED PHASE II
ENVIRONMENTAL SITE ASSESSMENT
11600 SMITH ROAD
AURORA, COLORADO**

**Project Number 2098017
May 4, 1999**

***Prepared for:*
NATIONWIDE MAGAZINE
DENVER, COLORADO**

***Prepared by:*
PARAGON CONSULTING GROUP, INC.
DENVER, COLORADO 80221**

PARAGON

laboratory analyses during the assessment. Copies of the laboratory reports for these samples dated February 11 and March 2, 1999 are included in Appendix D.

As seen from the laboratory reports, relatively low concentrations of toluene; total xylenes; 1,3,5-trimethylbenzene; 1,2,5-trimethylbenzene; tert-butylbenzene; sec-butylbenzene; 4-isopropyltoluene; n-butylbenzene; and naphthalene were observed in the 4.5 foot soil sample collected from Test Pit 18. The remainder of the VOCs were not observed laboratory detection limits. TEPH was observed at a concentration of 895 milligrams/Kilogram (mg/Kg) in the 4.5 foot soil sample collected from Test Pit 18. As also seen from the laboratory reports, VOCs and TEPH were not observed above laboratory detection limits in the nine (9) to 10.5 foot sample collected from Boring 1 located at Test Pit 18.

5.3 Groundwater Sample Results

Groundwater samples were collected from wells MW-1, MW-2 and MW-3 on February 22, 1999 and were transported under standard Paragon chain-of-custody procedures to TLI for VOC and dissolved metals analyses. A copy of the laboratory report dated February 25, 1999 is included in Appendix D.

As seen from the laboratory report, dissolved metals were not observed above laboratory detection limits in the groundwater samples collected from the site. VOCs were not observed above laboratory detection limits in the groundwater samples collected from MW-1 and MW-2. With the exception of relatively low concentrations of 1,3,5-trimethylbenzene; 1,2,4-trimethylbenzene; 4-isopropyltoluene and naphthalene, VOCs were not observed above laboratory detection limits in the groundwater sample collected from MW-3. The compounds observed above laboratory detection limits do not appear to regulated under the statewide interim organic pollutants as published in "The Basic Standards for Ground Water" Regulation 41, (5 CCR 1002-41) effective August 30, 1997.

6. FINDINGS AND CONCLUSIONS

Paragon has completed a Limited Phase II ESA in general accordance with the proposal to Nationwide Magazine dated February 10, 1999 of the property located at 11600 Smith Road in Aurora, Colorado. The following conclusions are made based on information obtained during the Limited Phase II ESA.

1. The site is located within an industrialized area and is in the vicinity of multiple UST, LUST, RCRA and landfill sites.

2. Landfilling activities appear to have occurred in the northwest portion of the site for a relatively short period of time during from approximately 1958 through 1960.
3. Based on Paragon's test pit observations, a significant amount of soil and construction debris is intermixed with household solid waste in the observed trash zone at the site. Trash zone thicknesses appear to vary from approximately 0.5 to 6 feet, based on Paragon's test pit observations. GEC observations indicated trash zone thickness of up to nine (9) feet. The nine (9) foot thickness was reportedly observed in one (1) GEC test pit. It appears that the total depth of the test pit may have been used to estimate the nine (9) foot trash thickness at that location. The bottom of the observed trash zone appears to vary between approximately three (3) to ten (10) feet bgs.
4. Based on gradation analyses, soils samples from MW-1 and MW-3 collected from below the observed trash zone, appear to consist of very fine to course sand with approximately 14 to 15 percent silt.
5. Groundwater has been observed at depths ranging from approximately 17.7 to 22.8 feet below site grades. The general groundwater flow direction at the site on February 22, 1999 appeared to be northwest. The hydraulic gradient was estimated to be approximately 0.005 on February 22, 1999. Groundwater appears to be present at approximately nine (9) to 14 feet below the observed trash zone.
6. The hydraulic conductivity was estimated to range from approximately 4.0×10^{-4} cm/sec to 6.2×10^{-4} cm/sec. The seepage velocity was estimated to range from approximately seven (7) to 16 feet per year.
7. LEL was observed to range from approximately 16 to 35 percent LEL in the CGMPs installed at the site. LEL was not observed in the percentage range during the test pit activities.
8. TEPH and relatively low concentrations of some VOCs were observed in the soil sample collected from approximately 4.5 feet bgs within the trash zone of Test Pit 18. TEPH and VOCs were not observed above laboratory detection limits in the soil sample collected from approximately nine (9) to 10.5 feet bgs in Boring 1 at Test Pit 18. These results appear to indicate that significant leaching of contaminants has not occurred from the trash zone to underlying soils.

9. Dissolved metals were not observed above laboratory detection limits in groundwater samples collected from the site.
10. VOCs were not observed above laboratory detection limits in groundwater samples collected from MW-1 and MW-2. Relatively low concentrations of some VOCs were observed in the groundwater sample collected from MW-3. The observed VOCs do not appear to be regulated under Colorado's current groundwater standards.
11. Based on the site assessment results, it appears that additional assessment and groundwater monitoring at this site is not warranted at this time.

7. RECOMMENDATIONS

The following recommendations are made based on the results of the Limited Phase II Environmental Site Assessment.

1. Based on the site assessment results, it is Paragon's opinion that CDPHE should consider this site closed.
2. If the subject site is developed, landfill gases should be monitored during construction activities. Engineering controls are advised to limit the potential for landfill gas migration into buildings and utilities developed at the site.
3. Trash and/or impacted soil removed from the site during construction activities should be disposed of in accordance with Federal, State and local regulations.

8. GENERAL COMMENTS

Paragon has performed a Limited Phase II ESA in general accordance with the proposal to Nationwide Magazine dated February 10, 1999. This assessment relied primarily upon readily available information, visual observations and laboratory analyses. This report does not reflect any variations in subsurface stratigraphy, geohydrology, or contaminant distribution which may occur between test pit, soil boring and monitoring well locations and/or across the vicinity of the site. Actual subsurface conditions may vary and may not become evident without further exploration. Due to the dynamic nature of groundwater flow and contaminant migration, subsurface conditions will vary with time. Paragon

**EXECUTIVE SUMMARY
PHASE I ENVIRONMENTAL SITE ASSESSMENT**

**Timminco Property
10380 Smith Road
Aurora, Colorado**

As authorized by Mr. Joseph Havas of Ruby Stein Wagner & Associates on October 27, 2006, Freedom Environmental Consultants performed a Phase I environmental site assessment (ESA) of the above-referenced site (site) in accordance with Freedom's proposal dated October 24, 2006 and in general accordance with the ASTM Standard E1527-05. The following is a summary of findings, conclusions and recommendations, and specific details were not included or fully developed in this section. The report must be read in its entirety for a comprehensive understanding of the items contained in this summary.

Site Description	
Approximate size	9 acres m/l
Property type Occupant(s)	Industrial Timminco Corporation
Nearby roadways	Smith Road adjoins the site to the north and Moline Street adjoins the site to the east.
Access to site	Access to the site is from Moline Street.
Improvements	The site is improved by a large commercial/industrial building (north) of approximately 78,000 square feet and a warehouse building (south) of approximately 36,000 square feet. The balance of the site includes outdoor storage and driveways to the north, east and west of the buildings and landscaped areas to the north.
Activity & Use Limitations (AULs)	None
Surrounding area	The site is located in an area of commercial and industrial businesses.

Historical Information Summary: The site acreage was undeveloped land in the 1940s and 1950s, but appeared to have been filled in the 1960s in preparation for development. The current north building was constructed in 1969 and historical information indicated that the south building was constructed in 1972. From the time of construction until about 1999, the site was occupied by Dow Chemical's Magnesium Extrusion fabrication plant. Since that time, Timminco has owned the business and continued the operation. Historical operations included some solvent use, and a subsurface investigation was conducted in 1999 at the time of the business sale. The investigation results indicated that low concentrations of volatile organic compounds were detected in the site soils and groundwater, but no detected concentrations exceeded any State or Federal action levels. Several metals were detected in soils and groundwater, but all were below action levels or were also detected in the upgradient wells suggesting an off-site source. The results of the subsurface investigation did not suggest RECs for the site.

The adjoining properties to the east and west were vacant range land in the 1940s and 1950s. Landfilling operations occurred on both properties prior to their current use. By

the early 1970s, commercial development of the adjoining property to the east had commenced. It continued into the early 1980s and has had a number of tenants since that time. Landfilling continued into the late 1960s or early 1970s on the adjoining property to the west. It was covered and has been undeveloped since that time. The nearest commercial development north of the site began about the same time as the site development and continued to expand through the 1990s. It has been occupied for many years by Frito Lay. The adjoining property to the south was first developed for commercial use by the early 1970s but the historic tenants were not identified in the city directory research. The adjoining historic property uses are not suspected to represent RECs for the site at this time.

Site Reconnaissance Summary: The site is improved by two commercial/industrial buildings. Currently, Timminco operates the facility that has been on site since 1969. Timminco has ceased use of much of the solvent that was identified in the 1999 subsurface investigation report. Currently, a limited number of solvents are used at the site for equipment maintenance. One solvent stand is operated and is maintained by Safety Kleen. Hydraulic are used to drive presses. Hydraulic pumps, flow lines, and presses are operated within areas of secondary containment or within closed trench and pit areas to contain any leaks. Acid and caustic baths are present in the south building and are used to clean dyes used in the fabrication operations. Waste acids and caustics as well as used oils are managed by Clean Harbors. Drummed new oil and used oil is stored inside the south building inside a secondary containment. The outdoor storage areas are used to store raw magnesium and aluminum products and miscellaneous items. No hazardous substances or wastes or petroleum products or wastes are stored outside. The current use is not a REC for the site.

Regulatory Database Summary: The site was identified as a registered storage tank facility, a Small Quantity Generator (SQG) of hazardous waste and for a spill in 1985. The tank contains propane and is not a REC for the site. The facility was cited in 2002 for a minor infraction related to their hazardous waste management, but they have not been referred to the corrective actions program. Their status as an SQG is not a REC for the site. The spill report indicated that the spilled chemical was PCBs and estimated the spilled volume at 10 to 20 gallons. The report indicated that the impacted medium was soil. Timminco personnel stated that they had no record of the spill in their files (it occurred before Timminco bought the site), and because of the age of the spill, the State and Federal agencies have no additional records. The available records suggested that it was cleaned up although there is no documentation available. Because of the magnitude and the age of the spill, it is not considered a REC for the site. The site was not identified on any other state or federal regulatory databases searched.

Regulated facilities adjoined the site to the east and west. Both are former landfill areas. The adjoining area to the east in the area cross- to upgradient was identified as demolition fill although some historic testing identified at least limited methane generation. In the event of groundwater contamination at that location, the groundwater beneath the subject site may be impacted. The facility to the west was identified for domestic fill, as well as other types of disposal. An investigation in that area suggested groundwater impacts. However, the facility is on the downgradient side of the site and should not pose a REC for the site. Several other regulated facilities were identified in the area generally upgradient but not adjoining the site. However, they did not appear to

represent RECs for the site. The remaining facilities were located in areas cross- to downgradient and are not considered RECs for the site.

Findings and Conclusions: This assessment has revealed no evidence of recognized environmental conditions (RECs) for the site.

With regard to the above-listed Findings and Conclusions, Freedom makes no recommendations for additional assessment at this time.

STATE OF COLORADO

Bill Owens, Governor
Jane E. Norton, Executive Director

Dedicated to protecting and improving the health and environment of the people of Colorado

HAZARDOUS MATERIALS AND WASTE MANAGEMENT DIVISION

<http://www.cdphe.state.co.us/hm/>

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Denver, Colorado 80246-1530
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Fax (303) 759-5355

222 S. 6th Street, Room 232
Grand Junction, Colorado 81501-2768
Phone (970) 248-7164
Fax (970) 248-7198



Colorado Department
of Public Health
and Environment

February 9, 1999

Ben Baker, Remediation Leader
The Dow Chemical Company
2020 Dow Center
Midland, MI 48674

Re: No Further Action at Dow Chemical Magnesium Fabricated Products Facility,
11380 E. Smith Road, Aurora, Adams County, Colorado


Dear Mr. Baker:

The Hazardous Materials and Waste Management Division of the Department of Public Health and Environment (the Division) has reviewed the report "Phase II Investigation Report for the Dow Chemical Magnesium Extrusion Facility, Aurora, Colorado" dated January 1999, prepared for Dow Chemical Company by URS Greiner Woodward Clyde. Soil and ground water samples were recovered from 16 locations around the site. Although some Volatile Organic Compounds (VOCs) were detected in several samples, all results were below Colorado Groundwater Standards (Regulation No. 41) and the Division's proposed Soil Remediation Objective concentrations. Petroleum hydrocarbons were detected in three isolated areas. Certain VOCs are no longer used at the facility, and the entire site is paved.

Based on the information provided, the Division requires no further action and allows closure for this site. However, please be aware that this letter does not relieve the property owner of liability or need for possible further actions should problems arise from contamination remaining on site.

Should you have any questions, I may be reached at (303) 692-3455.

Sincerely,


J. Peter Laux
Geologist, Solid Waste Unit
Compliance Program

cc: Michael Liuzzi, CDPHE-WQCD
Bruce Wilson, Tri-County Health Department

File SW/ADM/DOW - 4A

RECEIVED

FEB 17 1999

TRI-COUNTY HEALTH DEPARTMENT

1.1 PURPOSE AND SCOPE

Woodward-Clyde International Americas (Woodward-Clyde) was contracted by Dow Chemical Company USA (Dow) to perform a limited Phase II Environmental Investigation at Dow's Magnesium Extrusion Facility located at 11380 East Smith Road, Aurora, Colorado (Figure 1-1). The Phase II investigation was performed to assist Dow with their plans to sell the facility. The technical approach for the investigation was based upon Woodward-Clyde's proposal to Dow dated April 28, 1998 (Woodward-Clyde 1998a).

The Phase II field investigation included collection and analysis of soil and groundwater samples at the extrusion press pits, the former Otis operations area, the eastern boundary of the suspected off-site landfill, the drum storage area, and upgradient and downgradient groundwater quality at the property boundary.

Information collected and interpretations made regarding soil and groundwater conditions at the site are presented in the following sections of this document. On June 29, 1998, Dow notified CDPHE in writing of the potential for a release to groundwater beneath their facility. This report was prepared in response to the Colorado Department of Public Health and Environment (CDPHE) letter to Dow (dated August 6, 1998) requesting more information on conditions at the site. The facility was sold to Timminco Corporation in July 1998.

1.2 REPORT ORGANIZATION

This report discusses the Phase II investigation results and provides conclusions. This report is organized as follows:

- Section 1.0 - Introduction - The purpose and scope of the Phase II investigation are presented in this section, along with information on facility history and operations.
- Section 2.0 - Phase II Field Investigation - This section discusses the field work associated with the Phase II activities, including soil and groundwater sampling, QA/QC, and project documentation..
- Section 3.0 - Hydrogeologic Setting - This section presents a discussion of the physical characteristics of the site, including geologic and hydrogeologic conditions based on soil borings drilled during the investigation.
- Section 4.0 - Laboratory Analytical Results - This section presents the laboratory analytical results for soil and groundwater samples.
- Section 5.0 - Comparison of Analytical Results to Regulatory Standards and Goals - This section compares the laboratory analytical results for soil and groundwater samples to applicable regulatory standards.
- Section 6.0 - Conclusions - This section presents conclusions based on the findings of the Phase II investigation.
- Section 7.0 - Limitations - Limitations associated with the Phase II report.
- Section 8.0 - References - This section presents references used in preparation of this report.

1.3 FACILITY HISTORY AND OPERATIONS

The Dow Chemical Magnesium fabrication facility is situated on an approximate 5-acre tract of land which is leased by Dow. The property and buildings are owned by Samuel Sokoloff et al. and Dow's lease on the property extends to August 21, 1999.

The entire property has been developed for operations at the site. The facility consists of two buildings. These include the administration/fabrication building and the extrusion building. The site also has a storage yard between the two buildings.

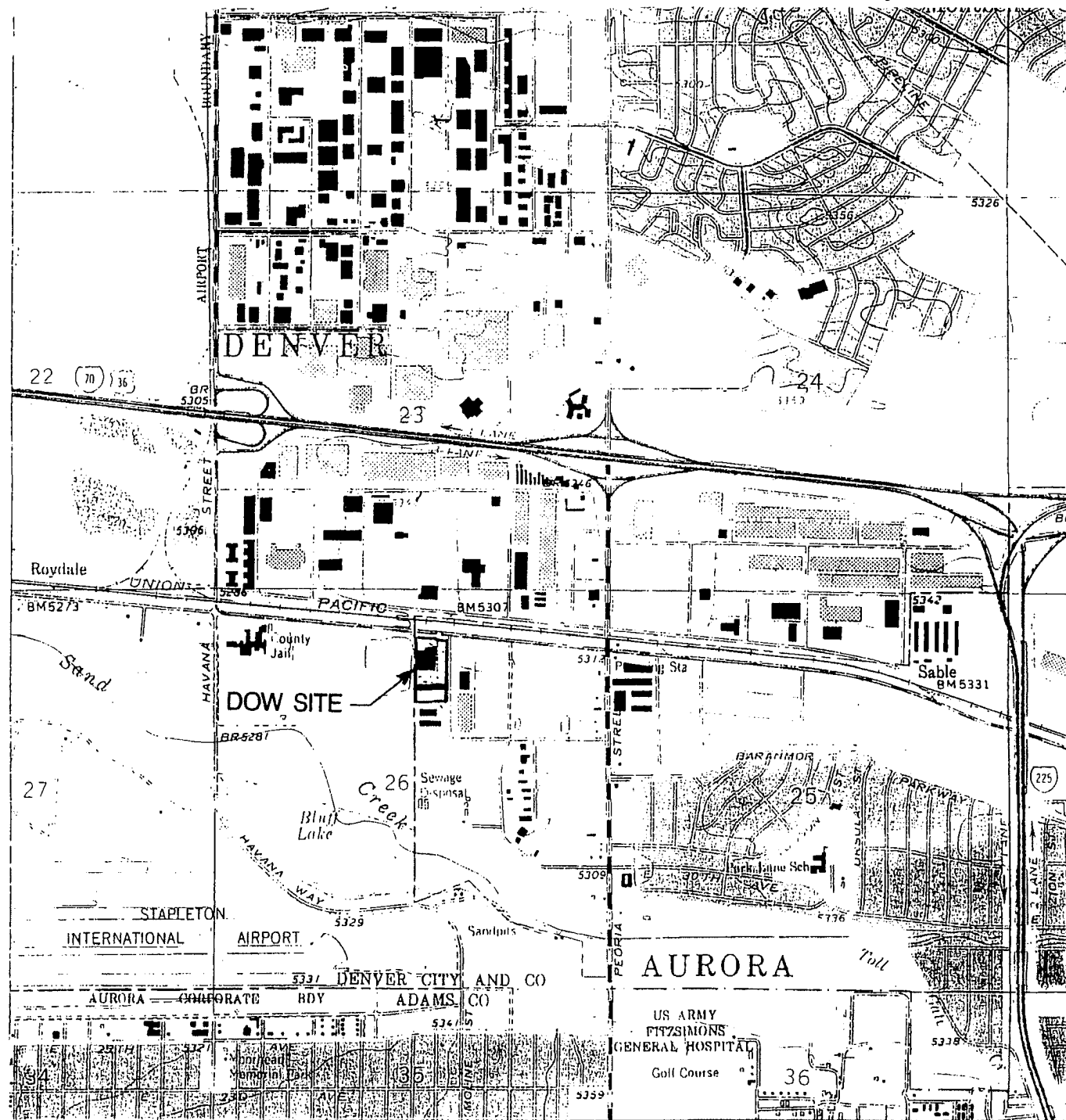
The land use around the Dow facility is of commercial and light industrial nature. Located to the west is the Denver County jail. To the south is a distribution facility and to the east, across Moline Avenue are several local businesses and warehouses. To the north, across Smith Road is a railroad right-of-way with a Frito-Lay facility beyond the railroad tracks.

Dow originally constructed the facility in 1969. The original building constructed in 1969 was the extrusion building. In 1972, the original machine shop was constructed. Beginning in the mid-1970s, the machine shop was leased to Otis Elevator for use as an engineering and fabrication facility. Dow took back the original machine shop in 1986 and converted it to administrative offices and the fabrication building.

The magnesium extrusion facility processes approximately 15 million pounds of magnesium per year. The manufacturing activities occur within both buildings at the site. Raw materials consisting of magnesium ingots and billets are brought in by truck and by rail car and are stored in the yard area or in the warehouse area. Seventeen inch diameter ingots are extruded through the 4,200 ton press to form 7-inch, 8-inch, or 9-inch diameter poles. These poles are cut into billets. The billets are extruded through the 1,800-ton press into various shapes and profiles. These shapes or profiles may be shipped directly to the customer or they may be sent to fabrication for further processing.

Fabrication includes processes such as machining and the installation of caps and other plastic components. All machining at the facility consists of dry machining. No cutting fluids are used at the facility. Products are shipped to customers or distribution sites on common carrier trucks or customer-owned trucks.

The facility operates 24 hours per day and 365 days per year. The facility employs approximately 70 people and operates four shifts. The facility employs a small number of contractors in various roles at the site. Timminco Corporation bought the facility from Dow in July 1998, and the plant continues to operate in much the same way as it did under Dow ownership.



SOURCE: USGS SABLE 7.5 MINUTE QUADRANGLE

Job No. :	24632
Prepared by :	DAK
Date :	6/4/98

SITE LOCATION MAP
 DOW CHEMICAL COMPANY, USA
 MAGNESIUM EXTRUSION FACILITY

FIG. 1-1

The Phase II field investigation focused on assessing the potential presence of contaminants in soil and groundwater at the Dow Magnesium Extrusion Facility. This was accomplished through collection and laboratory analysis of soil and groundwater samples at 16 locations. A summary of borehole drilling and monitoring well sampling activities is presented in Table 2-1. Locations of the monitoring wells and soil borings are shown on Figure 2-1. Two field efforts were completed during the Phase II investigation:

- April 30 to May 1, 1998 - This effort included Property Boundary Well Installation (installation and sampling of three temporary monitoring wells),
- May 12 to 15, 1998 - This effort included: 1) Property Boundary Well Installation (installation and sampling of one additional temporary monitoring well), 2), Extrusion Press Pits (installation and sampling of five temporary monitoring wells) and Former Otis Operations Area Investigation (drilling and sampling of three soil borings), 3), Suspected Landfill Eastern Boundary Investigation (installation and sampling of two temporary monitoring wells), and 4), Drum Storage Area Investigation (drilling and sampling of two soil borings).

2.1 DRILLING AND SAMPLING ACTIVITIES

A discussion of drilling and sampling activities is presented below. Drilling and well installation procedures are provided in Appendix A.

Property Boundary Well Installation

To evaluate hydrogeologic conditions (i.e., specifically groundwater occurrence, flow direction, and quality) at the facility boundary, three geoprobe temporary monitoring wells were installed and sampled (Figure 2-1). The upgradient monitoring well (DMW-03), installed along the south side of the mill building, was driven to 17.2 feet bgs. The two downgradient monitoring wells (DMW-01 and DMW-02) were installed along the north side of the north parking lot (DMW-01 was driven to 33.0 feet bgs) and along the fenceline west-southwest of the main building (DMW-02 was driven to 21.0 feet bgs). Based on initial groundwater flow direction results from these monitoring wells, a fourth property boundary monitoring well (DMW-10 located near the northeast corner of the mill building) was driven to 26.0 feet bgs and sampled.

Based on soil screening results shown in Table 2-2 (i.e., photoionization detector[PID] headspace readings less than 2.0 parts per million by volume [ppmv]) and no evidence of visual staining or odors, no soil samples were sent to the laboratory for chemical analysis from the four borings. Four groundwater samples (one from each monitoring well) were collected and analyzed for volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), total recoverable petroleum hydrocarbons (TRPH), and target analyte list (TAL) metals.

Extrusion Press Pits and Former Otis Operations Area Investigation

In order to assess potential impacts from the extrusion press pits, five geoprobe temporary monitoring wells were installed downgradient of the three press pits (4200-ton in main building, 1800-ton and 500-ton in mill building) based on the direction of groundwater flow (northwest) determined during the property boundary well installation task. Two monitoring wells (DMW-05 and DMW-06) were installed near the 4200-ton press in main building west of the pit

(DMW-05 was driven to 33.5 feet bgs) and northwest of the pit (DMW-06 was driven to 34.0 feet bgs). Two monitoring wells (DMW-08 and DMW-09) were installed near the 1800-ton press in the mill building, one northwest of the pit (DMW-08 was driven to 18.0 feet bgs) and the other north of the pit (DMW-09 was driven to 19.0 feet bgs). One monitoring well (DMW-07), installed near the 500 ton press in the mill building northwest of the metal berm, was driven to 19.5 feet bgs).

Based on soil screening results, six soil samples (one each from borings DMW-05, DMW-06, DMW-07, DMW-09 and two from boring DMW-08) were sent to the laboratory and analyzed for VOCs, SVOCs, TRPH, and TAL metals (Table 2-2). Five groundwater samples (one from each monitoring well) were collected and analyzed for VOCs, SVOCs, TRPH, and dissolved TAL metals.

Three soil borings were placed inside the main building in the area where Otis Elevators formerly operated (Figure 2-1). DSB-01, located east of the electrical room in the northern portion of the former Otis area, was driven to 27.0 feet bgs. DSB-02, located east of the pump room in the middle portion of the former Otis area, was driven to 27.0 feet bgs. DSB-03, located south of the oven in the southern portion of the former Otis area, was driven to 26.5 feet bgs.

Based on soil screening results (Table 2-2), four soil samples (one each from borings DSB-01 and DSB-03 and two from boring DSB-02) were sent to the laboratory and analyzed for VOCs, SVOCs, TRPH, and TAL metals (Table 2-2). Three one-time groundwater grab samples were collected (one from each boring) and analyzed for VOCs, SVOCs, TRPH, and dissolved TAL metals.

Suspected Landfill Eastern Boundary Investigation

In order to evaluate potential impacts from the suspected landfill area located offsite and west of the facility, two geoprobe temporary monitoring wells were installed and sampled (Figure 2-1). One well (DMW04), installed along the western property boundary near the northwest corner of the main building, was driven to 35.0 feet bgs. The second well (DMW-11), installed along the fence on the western property boundary due west of the pump room in the main building, was driven to 26.8 feet bgs.

Based on soil screening results, two soil samples (one from each boring) were sent to the laboratory and analyzed for VOCs, SVOCs, TRPH, and TAL metals (Table 2-2). Two groundwater samples were collected (one from each monitoring well) and analyzed for VOCs, SVOCs, TRPH, and dissolved TAL metals.

Drum Storage Area Investigation

In order to assess potential impacts from the drum storage area, two soil borings (DSB-04 and DSB-05) were placed in the area where empty hydraulic oil drums are temporarily stored. DSB-04, located close to the main building near the center of the drum storage area, was driven to 8 feet bgs. DSB-05, located near a surficial stain close to the fence, was also driven to 8 feet bgs. Based on soil screening results, two soil samples (one from each boring) were sent to the laboratory and analyzed for VOCs, SVOCs, TRPH, and TAL metals (Table 2-2).

A summary of monitoring well construction and well development is provided in Tables 2-3 and 2-4 respectively. Field boring logs and location survey data are presented in Appendix B.

2.1.1 Soil Sampling

Soil samples for laboratory analysis were selected based on either elevated headspace readings or evidence of visual contamination (i.e., either the presence of staining or odor). When soil samples could not be selected based on headspace or visual contamination, the soil sample collected at a depth interval immediately below the feature of interest was sent into the laboratory for analysis. A total of 14 soil samples were collected for laboratory analysis from 6 monitoring well and 5 soil borings. No soil samples from the four property boundary monitoring wells were sent for laboratory analysis.

Sample labels were filled out and affixed to sample bottles. The following laboratory supplied sample bottles were filled:

- 1 - 4-ounce glass jar for volatile organic compounds
- 1 - 16-ounce glass jar for semivolatile organic compounds, total recoverable petroleum hydrocarbons, and total TAL metals.

All soil samples were placed in a cooler with ice and kept at 4°C until they were hand delivered to Quanterra Environmental Services Laboratory in Arvada, Colorado. A chain-of-custody (COC) record was filled out in the field and placed in the cooler. Copies of COCs are contained in Appendix C. Copies of field sampling data sheets for each soil sample sent to the laboratory are contained in Appendix D.

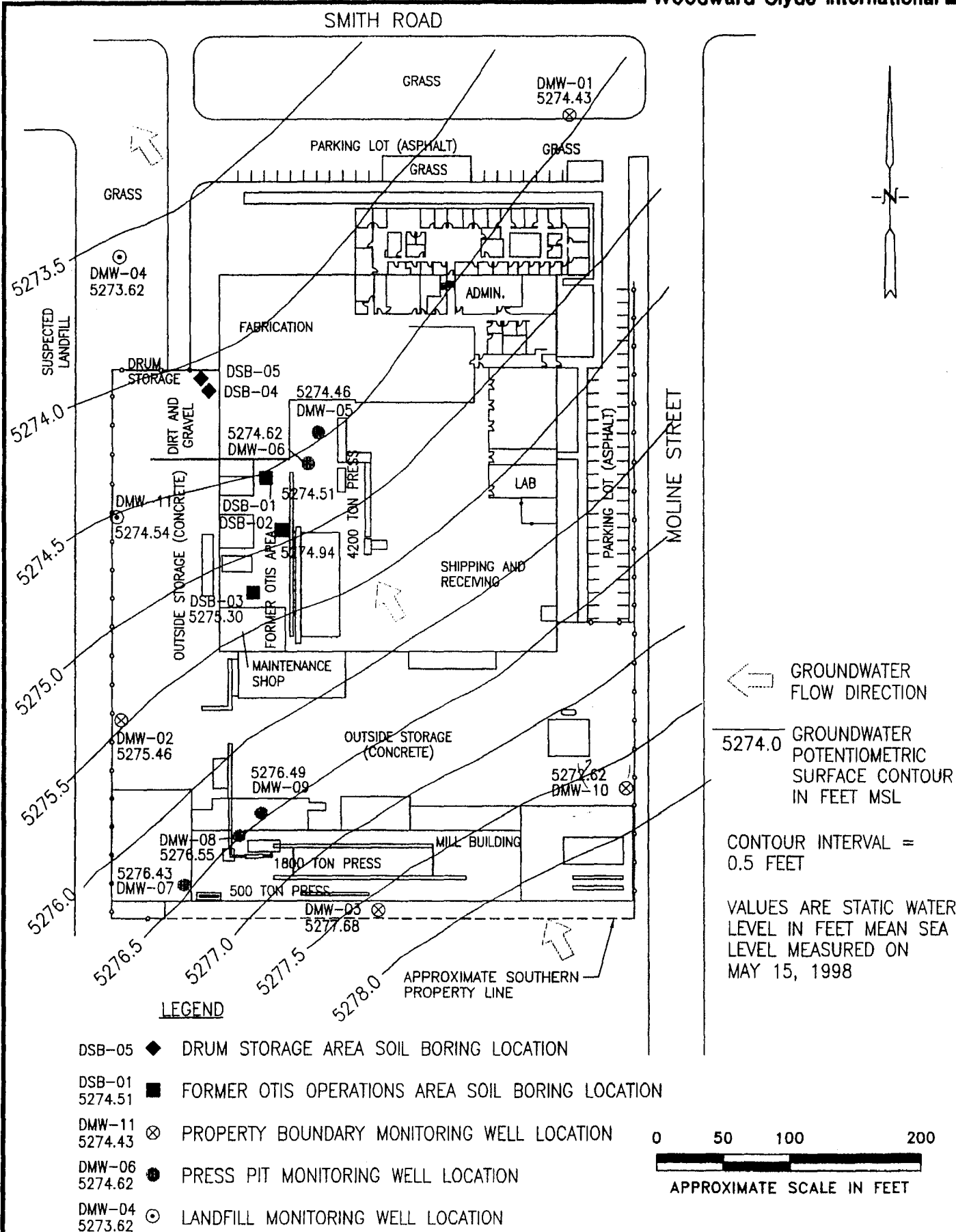
2.1.2 Groundwater Sampling

Groundwater sampling of the three property boundary monitoring wells was performed on May 1, 1998, while the other eight monitoring wells and three soil borings were sampled from May 12 to 15, 1998. Sample bottles for all analyses were provided by the laboratory. Equipment used for groundwater sampling such as bailers and water level probes was decontaminated prior to developing and sampling and between each monitoring well.

Samples for chemical analysis were obtained after purging was completed. The samples were collected below the water table from within the well screen interval using a peristaltic pump. Sample labels were filled out and affixed to sample bottles. The following laboratory supplied sample bottles were filled:

- 3 - 40-ml glass vials for volatile organic compounds
- 2 - 1 liter amber glass bottles for semivolatile organic compounds
- 2 - 1 liter amber glass bottles for total recoverable petroleum hydrocarbons
- 1 - 32 ounce polyethylene bottle for dissolved TAL metals

VOC sample vials were filled completely so that water formed a convex meniscus at the top, then capped such that no air space existed in the vial. Sample bottles for SVOCs, TRPH, and TAL metals were filled almost full and capped quickly. For dissolved TAL metals analysis, samples were filtered in the field using a 0.45 μ filter before filling the appropriate sample containers.



Job No. :	24632
Prepared by :	D.A.K.
Date :	11/19/98

GROUNDWATER POTENTIOMETRIC SURFACE MAP

DOW CHEMICAL COMPANY USA
MAGNESIUM EXTRUSION FACILITY

The purpose of the soil and groundwater sampling was to determine the current environmental conditions at the facility. A total of 13 soil samples (including 1 field duplicate and 1 matrix spike/matrix spike duplicate) and 14 groundwater samples (including 1 field duplicate and 1 matrix spike/matrix spike duplicate) were collected, sent to Quanterra Environmental Services Laboratory in Arvada, Colorado, and analyzed for VOCs, SVOCs, TRPH, and TAL metals.

The analytical results were checked by Woodward-Clyde for the following QA/QC components to evaluate the quality and usability of the data:

- Holding Times
- Laboratory Method Blanks
- Laboratory Control Samples
- Surrogate Recoveries
- Matrix Spike Sample Analysis
- Matrix Spike Duplicate Analysis
- Duplicate Sample Analysis
- Overall Assessment of Data

The VOC and TRPH results for soil and groundwater samples collected during the Phase II investigation are summarized in Tables 4-1 and 4-3, respectively. The metals results for soil and groundwater samples are summarized in Tables 4-2 and 4-4, respectively. The laboratory analytical data sheets are contained in Appendix E along with Woodward-Clyde's QA/QC evaluation. These data have been validated by Woodward-Clyde and appropriate data qualifiers are included with the results.

4.1 ANALYTICAL RESULTS FOR SOIL SAMPLES

One surface soil and 13 subsurface soil samples were collected and analyzed for the following:

- volatile organic compounds (VOCs) - (SW-846 / 8260)
- semivolatile organic compounds (SVOCs) - (SW-846 / 8270)
- total recoverable petroleum hydrocarbons (TRPH) - (SW-846 / 3550 and SW-846 / 418.1)
- total target analyte list (TAL) metals - (SW-846 / 6010A and SW-846 / 7471A)
 - aluminum, antimony, arsenic, barium, beryllium, cadmium, calcium, chromium, cobalt, copper, iron, lead, magnesium, manganese, mercury, nickel, potassium, selenium, silver, sodium, thallium, vanadium, zinc.

Volatile Organic Compounds

Seven VOCs were detected in three subsurface soil samples (Table 4-1 and Figure 4-1). All seven VOCs were detected in the subsurface soil sample collected at a depth of 3 feet bgs in monitoring well boring DMW-08 (located downgradient of the 1800-ton press pit in the mill building). Acetone (250 µg/kg), chloroethane (14 µg/kg), 1,1-dichloroethane (110 µg/kg),

tetrachloroethene (8.2 µg/kg), 1,1,1-trichloroethane (26 µg/kg), total xylenes (10 µg/kg), and 2-butanone (42 µg/kg) were detected above the reporting limit. Acetone was also detected in two other subsurface soil samples; 23 µg/kg at a depth of 4 feet bgs in monitoring well boring DMW-06 (located downgradient of the 4200-ton press pit in the main building), and 22 µg/kg at a depth of 6 feet bgs in soil boring DSB-02 (located in the former Otis operations area in the main building). Acetone and 2-butanone are common laboratory contaminants and are not considered to be site related. The other compounds are common constituents of solvents.

Semivolatile Organic Compounds

No SVOCs were detected above the reporting limits in the soil samples.

Total Recoverable Petroleum Hydrocarbons

TRPH, at concentrations of 2,970 mg/kg (3.0 feet bgs) and 2,700 mg/kg (12 feet bgs), was detected in two subsurface soil samples (Table 4-1), collected in boring DMW-08, the same sample in which the VOCs were detected. TRPH was also detected at concentrations of 102 mg/kg (boring DSB-04) and 974 mg/kg (boring DSB-05) in two samples collected in the drum storage area. At boring DMW-06 west of the 4200-ton press, TRPH was detected at 25.7 mg/kg.

Total TAL Metals

The total metals results (Table 4-2) indicate that 20 of 23 TAL metals were detected in one or more of the soil samples. The following metals were detected:

- aluminum - 14 samples -- 1,440 to 17,700 mg/kg
- arsenic - 14 samples -- 1.2 to 4.1 mg/kg
- barium - 14 samples -- 25.4 to 282 mg/kg
- cadmium - 2 samples -- 0.6 to 0.73 mg/kg
- calcium - 14 samples -- 869 to 8,060 mg/kg
- chromium - 14 samples -- 1.8 to 19.4 mg/kg
- cobalt - 14 samples -- 2.2 to 12.7 mg/kg
- copper - 14 samples -- 2.5 to 28.1 mg/kg
- iron - 14 samples -- 4,830 to 22,800 mg/kg
- lead - 14 samples -- 2.8 to 44.5 mg/kg
- magnesium- 14 samples -- 375 to 4,730 mg/kg
- manganese- 14 samples -- 162 to 552 mg/kg
- mercury - 1 sample -- 0.10 mg/kg
- nickel - 11 samples -- 5.2 to 15.2 mg/kg
- potassium - 13 samples -- 619 to 3,830 mg/kg
- selenium - 14 samples -- 0.52 to 1.6 mg/kg
- thallium - 2 samples -- 1.1 to 1.3 mg/kg

- vanadium - 14 samples -- 9.4 to 39.2 mg/kg
- zinc - 14 samples -- 8.9 to 104 mg/kg

4.2 ANALYTICAL RESULTS FOR GROUNDWATER SAMPLES

Groundwater samples were collected and analyzed for the following:

- volatile organic compounds (VOCs) - (SW-846 / 8260)
- semivolatile organic compounds (SVOCs) - (SW-846 / 8270)
- total recoverable petroleum hydrocarbons (TRPH) - (SW-846 / 3550 and SW-846 / 418.1)
- dissolved target analyte list (TAL) metals - (SW-846 / 6010A and SW-846 / 7470A)
 - aluminum, antimony, arsenic, barium, beryllium, cadmium, calcium, chromium, cobalt, copper, iron, lead, magnesium, manganese, mercury, nickel, potassium, selenium, silver, sodium, thallium, vanadium, zinc.

Results of the laboratory analyses for the groundwater samples are discussed below.

Volatile Organic Compounds

Five VOCs (1,1-dichloroethane [1,1-DCA], 1,2-dichloroethene [1,2-DCE], tetrachloroethene [PCE], toluene, and 1,1,1-trichloroethane [1,1,1-TCA]) were detected in 6 of 11 monitoring wells DMW-02, DMW-06, DMW-07, DMW-08, DMW-09, and DMW-11 (Table 4-3 and Figure 4-2):

- VOCs were detected in two wells (DMW-06: 1,1,1-TCA at 2.1 µg/l; DMW-11: 1,1,1-TCA at 7.5 µg/l) downgradient of the 4200-ton press pit in the main building.
- VOCs were detected in three wells (DMW-08: 1,1-DCA at 5.7 µg/l, toluene at 2.0 µg/l, 1,1,1-TCA at 13 µg/l; DMW-09: 1,1,1-TCA at 1.9 µg/l; and DMW-02: 1,1-DCA at 16 µg/l, 1,2-DCE at 1.1 µg/l, PCE at 1.5 µg/l, 1,1,1-TCA at 43 µg/l) downgradient of the 1800-ton press pit in the mill building.
- VOCs were detected in one well (DMW-07: 1,1-DCA at 13 µg/l, 1,1,1-TCA at 8.6 µg/l) downgradient of the 500-ton press pit in the mill building.

These compounds are common constituents of solvents.

In summary, the following VOCs had detectable concentrations in the 6 groundwater samples:

- 1,1-dichloroethane (1,1-DCA) - 3 samples -- 5.7 to 16 µg/l
- 1,2-dichloroethene (1,2-DCE) - 1 sample -- 1.1 µg/l
- tetrachloroethene (PCE) - 1 sample -- 1.5 µg/l
- toluene - 2 samples -- 1.5 to 2.0 µg/l
- 1,1,1-trichloroethane (1,1,1-TCA) - 5 samples -- 1.9 to 43 µg/l

Semivolatile Organic Compounds

No SVOCs were detected above reporting limits in the groundwater samples.

Total Recoverable Petroleum Hydrocarbons

TRPH was not detected above reporting limits in the groundwater samples.

Dissolved TAL Metals

The dissolved metals results indicate that 9 of 23 metals were detected in one or more of the samples (Table 4-4). The following metals had detectable concentrations in the groundwater samples:

- antimony - 1 sample -- 0.072 mg/l
- barium - 14 samples -- 0.037 to 0.063 mg/l
- beryllium - 3 samples -- 0.002 to 0.003 mg/l
- calcium - 14 samples -- 80.2 to 156 mg/l
- iron - 3 samples -- 0.177 to 0.247 mg/l
- magnesium- 14 samples -- 10.6 to 15.4 mg/l
- manganese - 14 samples -- 0.016 to 0.26 mg/l
- potassium - 6 samples -- 5.16 to 5.88 mg/l
- selenium - 14 samples -- 0.03 to 0.057 mg/l

TABLE 4-1

**SUMMARY OF VOLATILE AND SEMIVOLATILE ORGANIC COMPOUNDS AND TOTAL RECOVERABLE
PETROLEUM HYDROCARBONS DETECTED IN SOIL SAMPLES**

**The Dow Chemical Company USA, Magnesium Extrusion Facility
Aurora, Colorado**

Monitoring Well / Soil Borehole Number	Sample Number	Sample Depth (Ft-BGS)	Date Sampled	Time Sampled	QA/QC Sample Type	Headspace Reading (ppmv)	Laboratory Analytical Results								
							Acetone (µg/kg)	Chloro- ethane (µg/kg)	1,1-Dichloro- ethane (µg/kg)	Tetrachloro- ethene (µg/kg)	1,1,1-Trichloro- ethane (µg/kg)	Total Xylenes (µg/kg)	2-Butanone (µg/kg)	SVOC (µg/kg)	TRPH (mg/kg)
DMW-04	DMW04-S-06	6 to 8	12-May-98	8:27		1.0	ND	ND	ND	ND	ND	ND	ND	ND	ND
DMW-05	DMW05-S-08	8 to 10	12-May-98	14:00		0.0	ND	ND	ND	ND	ND	ND	ND	ND	ND
DMW-06	DMW06-S-04	4 to 6	13-May-98	14:43		0.4	23	ND	ND	ND	ND	ND	ND	ND	25.7
DMW-07	DMW07-S-02	2 to 4	14-May-98	15:15		15.0	ND	ND	ND	ND	ND	ND	ND	ND	ND
	DMW07-S-02 D	2 to 4	14-May-98	15:17	FD	15.0	ND	ND	ND	ND	ND	ND	ND	ND	ND
DMW-08	DMW08-S-03	3 to 6	15-May-98	8:55		120.0	250	14	110	8.2	26	10	42	ND	2,970
	DMW08-S-12	12 to 14	15-May-98	9:25		30.0	ND	ND	ND	ND	ND	ND	ND	ND	2,700
DMW-09	DMW09-S-02	2 to 4	15-May-98	11:05		0.0	ND	ND	ND	ND	ND	ND	ND	ND	ND
DMW-11	DMW11-S-20	20 to 22	14-May-98	9:30		15.0	ND	ND	ND	ND	ND	ND	ND	ND	ND
DSB-01	DSB01-S-04	4 to 6	12-May-98	17:20		0.3	ND	ND	ND	ND	ND	ND	ND	ND	ND
DSB-02	DSB02-S-06	6 to 8	13-May-98	8:30		0.8	22	ND	ND	ND	ND	ND	ND	ND	ND
	DSB02-S-18	18 to 19.5	13-May-98	9:05		0.8	ND	ND	ND	ND	ND	ND	ND	ND	ND
DSB-03	DSB03-S-02	2 to 4	13-May-98	11:00		0.3	ND	ND	ND	ND	ND	ND	ND	ND	ND
DSB-04	DSB04-S-04	4 to 6	14-May-98	18:28		2.0	ND	ND	ND	ND	ND	ND	ND	ND	102
DSB-05	DSB05-S-00	0 to 2	14-May-98	18:40		1.0	ND	ND	ND	ND	ND	ND	ND	ND ¹	974
	DSB05-S-00 MS/MSD	0 to 2	14-May-98	18:40	MS/MSD	1.0									
Number of Detections							3	1	1	1	1	1	1		0
Minimum Concentration Detected							22	14	110	8.2	26	10	42		26
Maximum Concentration Detected							250	14	110	8.2	26	10	42		2970
Chemical-Specific Standards or Goals															
EPA Region III Risk-Based Concentrations for Soil (Industrial)							200,000,000	2,000,000	200,000,000	110,000	41,000,000	1,000,000,000	1,000,000,000		None
EPA Region III Risk-Based Concentrations for Soil (Residential)							7,800,000	220,000	7,800,000	12,000	1,600,000	160,000,000	47,000,000		None
Proposed Colorado Soil Remediation Cleanup Standards (Industrial)							None	None	1,000,000	7,680	1,000,000	1,000,000	None		None
Proposed Colorado Soil Remediation Cleanup Standards (Commercial)							None	None	1,000,000	8,970	1,000,000	1,000,000	None		None
Proposed Colorado Soil Remediation Cleanup Standards (Residential)							None	None	546,800	2,020	797,190	1,000,000	None		None
Proposed Colorado Soil Remediation Cleanup Standards (Protective of Groundwater)							None	None	16,500	1,875	62,500	1,000,000	None		None

TABLE 4-1

**SUMMARY OF VOLATILE AND SEMIVOLATILE ORGANIC COMPOUNDS AND TOTAL RECOVERABLE
PETROLEUM HYDROCARBONS DETECTED IN SOIL SAMPLES**

**The Dow Chemical Company USA, Magnesium Extrusion Facility
Aurora, Colorado**

UJ = estimated reporting limit.

¹ Several semivolatile organic compounds were qualified "UJ" based on low matrix spike recoveries.

Ft-BGS	feet below ground surface	FD	= field duplicate
ppmv	parts per million by volume	MS/MSD	= matrix spike/matrix spike duplicate
µg/kg	micrograms per kilogram	ND	= not detected
mg/kg	milligrams per kilogram	NS	= no standard
TRPH	total recoverable petroleum hydrocarbons	NA	= not applicable

TABLE 4-2

SUMMARY OF TARGET ANALYTE LIST METALS DETECTED IN SOIL SAMPLES

**The Dow Chemical Company USA, Magnesium Extrusion Facility
Aurora, Colorado**

Monitoring Well / Soil Borehole Number	Sample Number	Sample Depth (Ft-BGS)	Date Sampled	Time Sampled	QA/QC Sample Type	Laboratory Analytical Results							
						Aluminum (mg/kg)	Antimony (mg/kg)	Arsenic (mg/kg)	Barium (mg/kg)	Beryllium (mg/kg)	Cadmium (mg/kg)	Calcium (mg/kg)	Chromium (mg/kg)
DMW-04	DMW04-S-06	6 to 8	12-May-98	8:27		10100	7.3 UJ	3.3	252	0.75	ND	5770	11.4
DMW-05	DMW05-S-08	8 to 10	12-May-98	14:00		7680	6.4 UJ	3.3	134	0.67	0.6	2940	9.5
DMW-06	DMW06-S-04	4 to 6	13-May-98	14:43		14700	6.7 UJ	3.3	262	1.1	ND	7970	15.6
DMW-07	DMW07-S-02	2 to 4	14-May-98	15:15		6800	7.2 UJ	2.9	127	0.47	ND	2760	8.2
	DMW07-S-02 D	2 to 4	14-May-98	15:17	FD	6900	6.9 UJ	2.2	150	0.5	ND	4220	8.1
DMW-08	DMW08-S-03	3 to 6	15-May-98	8:55		13200	7.5 UJ	4.1	282	0.84	ND	7790	13.7
	DMW08-S-12	12 to 14	15-May-98	9:25		2840	6.3 UJ	1.2	63.0	0.24	ND	1500	4.4
DMW-09	DMW09-S-02	2 to 4	15-May-98	11:05		5910	6.9 UJ	2.5	107	0.43	ND	1950	7.0
DMW-11	DMW11-S-20	20 to 22	14-May-98	9:30		3060	7.5 UJ	1.8	62.9	0.28	ND	1140	4.2
DSB-01	DSB01-S-04	4 to 6	12-May-98	17:20		17000	6.8 UJ	3.1	211	1.2	ND	8060	19.4
DSB-02	DSB02-S-06	6 to 8	13-May-98	8:30		11500	6.5 UJ	2.3	180	0.76	0.73	5430	12.2
	DSB02-S-18	18 to 19.5	13-May-98	9:05		1440	6.2 UJ	1.2	25.4	ND	ND	869	1.8
DSB-03	DSB03-S-02	2 to 4	13-May-98	11:00		11400	6.6 UJ	2.3	148	0.73	ND	4210	11.7
DSB-04	DSB04-S-04	4 to 6	14-May-98	18:28		13000	7.2 UJ	3.4	161	0.80	ND	2880	13.6
DSB-05	DSB05-S-00	0 to 2	14-May-98	18:40		13500	7.0 UJ	3.1	177	0.88	ND	4230	14.0
	DSB05-S-00 MS/MSD	0 to 2	14-May-98	18:40	MS/MSD								
Number of Detections						14	0	14	14	13	2	14	14
Minimum Concentration Detected						1440	6.2	1.2	25.4	0.24	0.6	869	1.8
Maximum Concentration Detected						17000	7.5	4.1	282	1.2	0.73	8060	19.4
Chemical-Specific Standards or Goals													
EPA Region III Risk-Based Concentrations for Soil (Industrial)						1,000,000	820	610	140,000	1.3	1,000	None	1,000,000
EPA Region III Risk-Based Concentrations for Soil (Residential)						78,000	31	23	5,500	0.15	39	None	78,000
Proposed Colorado Soil Remediation Cleanup Standards (Industrial)						None	None	0.82	None	None	694.46	None	208.57
Proposed Colorado Soil Remediation Cleanup Standards (Commercial)						None	None	1.04	None	None	1052.46	None	212.92
Proposed Colorado Soil Remediation Cleanup Standards (Residential)						None	None	0.21	None	None	99.50	None	53.94
Ranges Published by USGS for Denver Area (Shacklette and Boerngen, 1984).						70,000 -- 100,000	<1.0	2.6 -- 4.1	700 -- 5,000	1.5 -- 15.0	1.0	12,000 -- 28,000	1.0 -- 20.0

Ft-BGS = Feet below ground surface
 mg/kg = milligrams per kilogram
 FD = field duplicate

MS/MSD = matrix spike/matrix spike duplicate
 ND = not detected
 UJ = not detected at estimated reporting limit

3.1 Boxed values exceed the EPA Region III Risk-Based Concentration for soil ingestion

4.1 Boxed and shaded values exceed one of the proposed Colorado soil cleanup standards (industrial, commercial, residential).

TABLE 4-2

SUMMARY OF TARGET ANALYTE LIST METALS DETECTED IN SOIL SAMPLES

**The Dow Chemical Company USA, Magnesium Extrusion Facility
Aurora, Colorado**

Monitoring Well / Soil Borehole Number	Sample Number	Sample Depth (Ft-BGS)	Date Sampled	Time Sampled	QA/QC Sample Type	Laboratory Analytical Results							
						Cobalt (mg/kg)	Copper (mg/kg)	Iron (mg/kg)	Lead (mg/kg)	Magnesium (mg/kg)	Manganese (mg/kg)	Mercury (mg/kg)	Nickel (mg/kg)
DMW-04	DMW04-S-06	6 to 8	12-May-98	8:27		9.0	13.7	16800	9.6	3150	463	ND	9.3
DMW-05	DMW05-S-08	8 to 10	12-May-98	14:00		6.5	12.3	13200	12.4	2200	330J	ND	7.1
DMW-06	DMW06-S-04	4 to 6	13-May-98	14:43		9.0	18.0	20500	12.7	3950	479	ND	12.9
DMW-07	DMW07-S-02	2 to 4	14-May-98	15:15		5.0	10.3	12400	13.4	1610	344	ND	5.9
	DMW07-S-02 D	2 to 4	14-May-98	15:17	FD	5.7	10.7	11900	13.4	1690	388	ND	6.6
DMW-08	DMW08-S-03	3 to 6	15-May-98	8:55		12.7	28.1	17300	44.5	3360	423	0.10	15.2
	DMW08-S-12	12 to 14	15-May-98	9:25		2.8	4.4	7670	3.7	670	221	ND	ND
DMW-09	DMW09-S-02	2 to 4	15-May-98	11:05		4.5	8.7	10900	12.3	1410	373	ND	5.2
DMW-11	DMW11-S-20	20 to 22	14-May-98	9:30		3.1	5.5	9180	4.4	671	271	ND	ND
DSB-01	DSB01-S-04	4 to 6	12-May-98	17:20		10.6	20.3	22800	14.9	4730	474J	ND	13.9
DSB-02	DSB02-S-06	6 to 8	13-May-98	8:30		8.0	15.2	17700	9.4	3190	407J	ND	9.1
	DSB02-S-18	18 to 19.5	13-May-98	9:05		2.2	2.5	4830	2.8	375	162J	ND	ND
DSB-03	DSB03-S-02	2 to 4	13-May-98	11:00		7.0	13.1	16600	9.1	2960	358J	ND	8.3
DSB-04	DSB04-S-04	4 to 6	14-May-98	18:28		8.1	17.4	17700	19.5	2610	552	ND	11.3
DSB-05	DSB05-S-00	0 to 2	14-May-98	18:40		7.1	17.3	17800	20.5	3070	310	ND	10.9
	DSB05-S-00 MS/MSD	0 to 2	14-May-98	18:40	MS/MSD								
Number of Detections						14	14	14	14	14	14	1	11
Minimum Concentration Detected						2.2	2.5	4830	2.8	375	221	0.1	5.2
Maximum Concentration Detected						12.7	28.1	22800	44.5	4730	552	0.1	15.2
Chemical-Specific Standards or Goals													
EPA Region III Risk-Based Concentrations PRGs for Soil (Industrial)						120,000	82,000	610,000	None	None	47,000	610	41,000
EPA Region III Risk-Based Concentrations PRGs for Soil (Residential)						4,700	3,100	23,000	None	None	1,800	23	1,600
Proposed Colorado Soil Remediation Cleanup Standards (Industrial)						None	27,537	None	1,460	None	None	137.07	None
Proposed Colorado Soil Remediation Cleanup Standards (Commercial)						None	41,522	None	2,920	None	None	176.53	None
Proposed Colorado Soil Remediation Cleanup Standards (Residential)						None	2,570	None	400	None	None	17.66	None
Ranges Published by USGS for Denver Area (Shacklette and Boerngen, 1984).						7.0 -- 10.0	20.0 -- 30.0	20,000 -- 30,000	20.0 -- 700	3,000 -- 7,000	500 -- 700	0.05 -- 0.13	10.0 -- 15.0

Ft-BGS = Feet below ground surface

mg/kg = milligrams per kilogram

FD = field duplicate

MS/MSD = matrix spike/matrix spike duplicate

ND = not detected

J = estimated result

3.1 Boxed values exceed the EPA Region III Risk-Based Concentration for soil ingestion

4.1 Boxed and shaded values exceed one of the proposed Colorado soil cleanup standards (industrial, commercial, residential).

TABLE 4-2

SUMMARY OF TARGET ANALYTE LIST METALS DETECTED IN SOIL SAMPLES

**The Dow Chemical Company USA, Magnesium Extrusion Facility
Aurora, Colorado**

Monitoring Well / Soil Borehole Number	Sample Number	Sample Depth (Ft-BGS)	Date Sampled	Time Sampled	QA/QC Sample Type	Laboratory Analytical Results						
						Potassium (mg/kg)	Selenium (mg/kg)	Silver (mg/kg)	Sodium (mg/kg)	Thallium (mg/kg)	Vanadium (mg/kg)	Zinc (mg/kg)
DMW-04	DMW04-S-06	6 to 8	12-May-98	8:27		2560	1.2	ND	ND	ND	30.1	45.9
DMW-05	DMW05-S-08	8 to 10	12-May-98	14:00		2540	1.2	ND	ND	ND	24.2	39.7
DMW-06	DMW06-S-04	4 to 6	13-May-98	14:43		3610	1.4	ND	ND	ND	36.0	56.9
DMW-07	DMW07-S-02	2 to 4	14-May-98	15:15		1800	0.83	ND	ND	ND	24.5	31.7
	DMW07-S-02 D	2 to 4	14-May-98	15:17	FD	1790	1.0	ND	ND	ND	23.1	33.8
DMW-08	DMW08-S-03	3 to 6	15-May-98	8:55		3230	1.4	ND	ND	ND	34.4	104
	DMW08-S-12	12 to 14	15-May-98	9:25		619	0.74	ND	ND	ND	16.3	14.4
DMW-09	DMW09-S-02	2 to 4	15-May-98	11:05		1610	0.82	ND	ND	ND	20.3	28.3
DMW-11	DMW11-S-20	20 to 22	14-May-98	9:30		637	0.82	ND	ND	ND	17.5	14.6
DSB-01	DSB01-S-04	4 to 6	12-May-98	17:20		3830	1.6	ND	ND	1.3	39.2	67.1
DSB-02	DSB02-S-06	6 to 8	13-May-98	8:30		2720	1.3	ND	ND	ND	32.4	48.2
	DSB02-S-18	18 to 19.5	13-May-98	9:05		ND	0.52	ND	ND	ND	9.4	8.9
DSB-03	DSB03-S-02	2 to 4	13-May-98	11:00		2680	1.1	ND	ND	1.1	30.1	44.4
DSB-04	DSB04-S-04	4 to 6	14-May-98	18:28		3550	1.4	ND	ND	ND	32.1	53.8
DSB-05	DSB05-S-00	0 to 2	14-May-98	18:40		3390	1.1	ND	ND	ND	31.6	60.2
	DSB05-S-00 MS/MSD	0 to 2	14-May-98	18:40	MS/MSD							
Number of Detections						13	14	0	0	2	14	14
Minimum Concentration Detected						619	0.52	0	0	1.1	9.4	8.9
Maximum Concentration Detected						3830	1.6	0	0	1.3	39.2	104
Chemical-Specific Standards or Goals												
EPA Region III Risk-Based Concentrations PRGs for Soil (Industrial)						None	10,000	10,000	None	0	14,000	610,000
EPA Region III Risk-Based Concentrations PRGS for Soil (Residential)						None	390	390	None	0	550	23,000
Proposed Colorado Soil Remediation Cleanup Standards (Industrial)						None	None	None	None	None	None	None
Proposed Colorado Soil Remediation Cleanup Standards (Commercial)						None	None	None	None	None	None	None
Proposed Colorado Soil Remediation Cleanup Standards (Residential)						None	None	None	None	None	None	None
Ranges Published by USGS for Denver Area (Shacklette and Boerngen, 1984).						20,000 -- 60,000	0.1 -- 0.2	2.0	10,000 -- 100,000	No Data	50.0 -- 70.0	45.0 -- 74.0

Ft-BGS = Feet below ground surface

mg/kg = milligrams per kilogram

FD = field duplicate

MS/MSD = matrix spike/matrix spike duplicate

ND = not detected

3.1 Boxed values exceed the EPA Region III Risk-Based Concentration for soil ingestion

4.1 Boxed and shaded values exceed one of the proposed Colorado soil cleanup standards (industrial, commercial, residential).

TABLE 4-3

SUMMARY OF VOLATILE AND SEMIVOLATILE ORGANIC COMPOUNDS AND TOTAL RECOVERABLE PETROLEUM HYDROCARBONS DETECTED IN GROUNDWATER SAMPLES

The Dow Chemical Company USA, Magnesium Extrusion Facility Aurora, Colorado

Monitoring Well / Soil Borehole Number	Sample Number	Date Sampled	Time Sampled	QA/QC Sample Type	Laboratory Analytical Results										
					Acetone (µg/l)	Chloro-ethane (µg/l)	1,1-Dichloro-ethane (µg/l)	1,2-Dichloro-ethene (µg/l)	Tetrachloro-ethene (µg/l)	Toluene (µg/l)	1,1,1-Trichloro-ethane (µg/l)	Total Xylenes (µg/l)	2-Butanone (µg/l)	SVOC (µg/l)	TRPH (mg/l)
DMW-01	DMW01-01-01	1-May-98	14:12		ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
DMW-02	DMW02-01-01	1-May-98	12:33		ND	ND	16	1.1	1.5	ND	43	ND	ND	ND ²	ND
DMW-03	DMW03-01-01	1-May-98	10:21		ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
DMW-04	DMW04-01-01	14-May-98	14:27		ND	ND	ND	ND	ND	ND	ND	ND	ND	ND ²	ND
DMW-05	DMW05-01-01	13-May-98	16:00		ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
DMW-06	DMW06-01-01	14-May-98	12:11		ND	ND	ND	ND	ND	ND	2.1	ND	ND	ND	ND
DMW-07	DMW07-01-01	14-May-98	18:01		ND	ND	13	ND	ND	ND	8.6	ND	ND	ND	ND
	DMW07-02-01	14-May-98	18:41	FD	ND	ND	14	ND	ND	ND	8.8	ND	ND	ND	ND
DMW-08	DMW08-01-01	15-May-98	12:28		ND	ND	5.7	ND	ND	2.0	13	ND	ND	ND	ND
DMW-09	DMW09-01-01	15-May-98	14:21		ND	ND	ND	ND	ND	ND	1.9	ND	ND	ND	ND
DMW-10	DMW10-01-01	14-May-98	16:04		ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
DMW-11	DMW11-01-01	14-May-98	9:30		ND	ND	ND	ND	ND	ND	7.5	ND	ND	ND	ND
DSB-01	DSB01-GW-01	12-May-98	18:44		ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
DSB-02	DSB02-GW-01	13-May-98	9:42		ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
DSB-03	DSB03-GW-01	13-May-98	12:31		ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	DSB03-GW-01 MS/MSD	13-May-98	12:31	MS/MSD											
Number of Detections					0	0	3	1	1	2	5	0	0		0
Minimum Concentration Detected					0	0	5.7	1.1	1.5	2	1.9	0	0		0
Maximum Concentration Detected					0	0	16	1.1	1.5	2.0	43	0	0		0
Chemical-Specific Standards or Goals															
EPA Drinking Water Maximum Contaminant Levels (MCLs)					NS	NS	NS	70	5	1000	200	10000	NS		NS
Colorado Groundwater Drinking Water Standards					NS	NS	NS	70	10	2420	200	NS	NS		NS

Ft-BGS feet below ground surface

µg/l micrograms per liter

mg/l milligrams per liter

TRPH total recoverable petroleum hydrocarbons

FD = field duplicate

MS/MSD = matrix spike/matrix spike duplicate

ND = not detected

NS = no standard

² Acid fraction semivolatile analytes were qualified "UJ" based on low surrogate recoveries.

TABLE 4-4

SUMMARY OF TARGET ANALYTE LIST METALS DETECTED IN GROUNDWATER SAMPLES

**The Dow Chemical Company USA, Magnesium Extrusion Facility
Aurora, Colorado**

Monitoring Well / Soil Borehole Number	Sample Number	Date Sampled	Time Sampled	QA/QC Sample Type	Laboratory Analytical Results								
					Antimony (mg/l)	Barium (mg/l)	Beryllium (mg/l)	Calcium (mg/l)	Iron (mg/l)	Magnesium (mg/l)	Manganese (mg/l)	Potassium (mg/l)	Selenium (mg/l)
DMW-01	DMW01-01-01	1-May-98	14:12		ND	0.061	ND	156	ND	15.4	0.26	ND	0.054
DMW-02	DMW02-01-01	1-May-98	12:33		ND	0.058	ND	126	ND	11.9	0.051	ND	0.044
DMW-03	DMW03-01-01	1-May-98	10:21		0.072	0.063	ND	140	ND	12.0	0.095	ND	0.057
DMW-04	DMW04-01-01	14-May-98	14:27		ND	0.046	ND	140	ND	14.9	0.137	5.22	0.037
DMW-05	DMW05-01-01	13-May-98	16:00		ND	0.042	ND	103	ND	13.5	0.257	5.34	0.042
DMW-06	DMW06-01-01	14-May-98	12:11		ND	0.038	ND	131	ND	13.6	0.197	ND	0.039
DMW-07	DMW07-01-01	14-May-98	18:01		ND	0.050	ND	117	ND	11.9	0.054	ND	0.036
	DMW07-02-01	14-May-98	18:41	FD	ND	0.037	ND	122	ND	12.0	0.124	ND	0.036
DMW-08	DMW08-01-01	15-May-98	12:28		ND	0.051	ND	80.2	ND	10.6	0.161	ND	0.030
DMW-09	DMW09-01-01	15-May-98	14:21		ND	0.061	ND	88.1	ND	11.4	0.094	5.33	0.032
DMW-10	DMW10-01-01	14-May-98	16:04		ND	0.045	ND	133	ND	13.7	0.072	5.16	0.042
DMW-11	DMW11-01-01	14-May-98	9:30		ND	0.050	ND	119	ND	11.9	0.064	ND	0.038
DSB-01	DSB01-GW-01	12-May-98	18:44		ND	0.047	0.003	98.7	0.247	14.2	0.024	5.88	0.057
DSB-02	DSB02-GW-01	13-May-98	9:42		ND	0.048	0.002	99.7	0.177	13.7	0.046	5.79	0.050
DSB-03	DSB03-GW-01	13-May-98	12:31		ND	0.039	0.002	89.7	0.218	11.9	0.016	ND	0.047
	DSB03-GW-01 MS/MS	13-May-98	12:31	MS/MSD									
Number of Detections					1	14	3	14	3	14	14	6	14
Minimum Concentration Detected					0.072	0.037	0.002	80.2	0.177	10.6	0.016	5.16	0.03
Maximum Concentration Detected					0.072	0.063	0.003	156	0.247	15.4	0.26	5.88	0.057
Chemical-Specific Standards or Goals													
EPA Drinking Water Maximum Contaminant Levels (MCLs)					0.006	2.0	0.004	NS	0.3	NS	0.05	NS	0.05
Colorado Groundwater Drinking Water Standards					NS	1.0	NS	NS	0.3	NS	0.05	NS	0.01

Ft-BGS = feet below ground surface

mg/l = milligrams per liter

ND = not detected

FD = field duplicate

MS/MSD = matrix spike/matrix spike duplicate

NS = no standard

0.064

Boxed and shaded values exceed the more stringent of the two (EPA or Colorado) groundwater drinking water standards

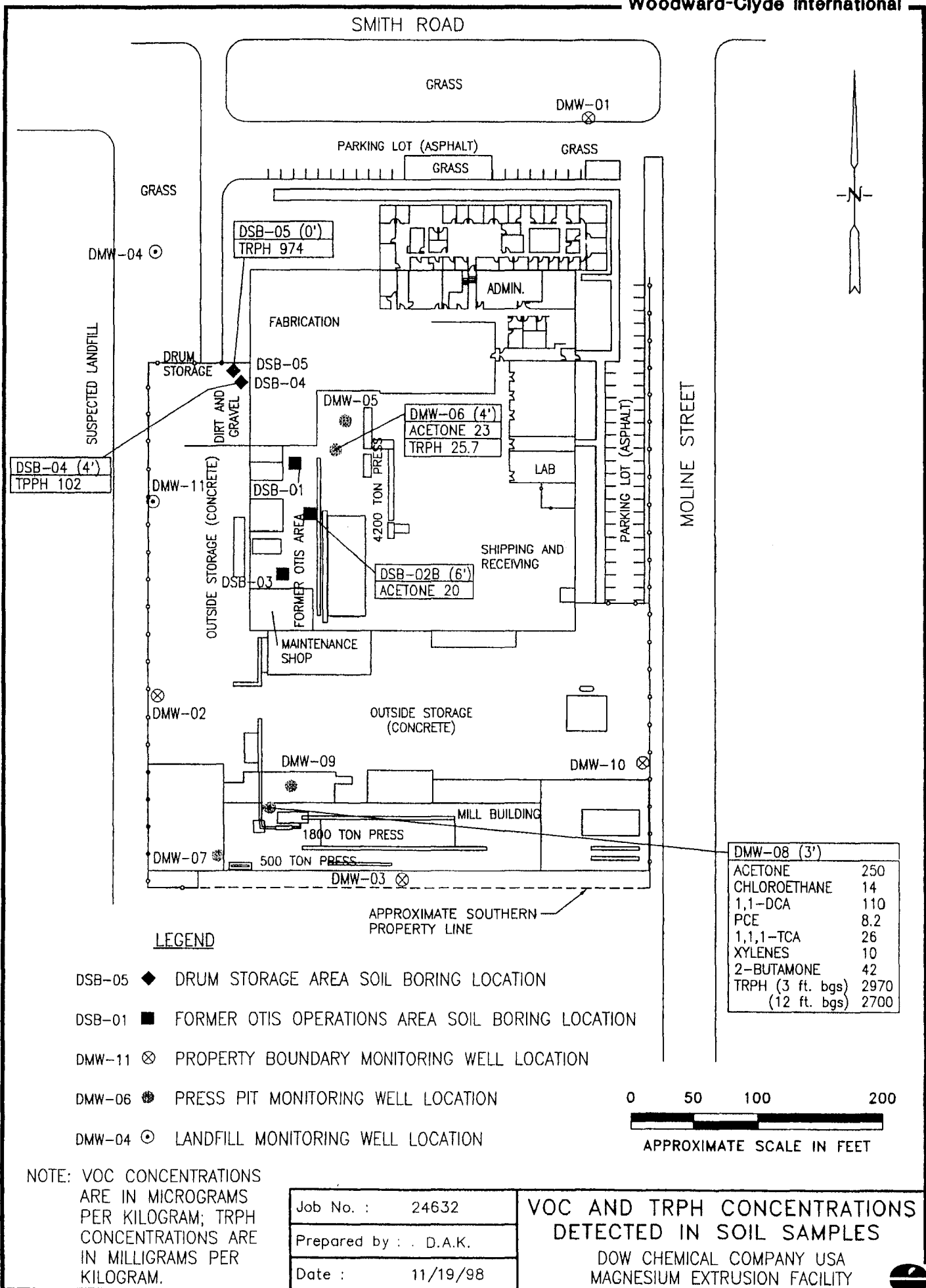


FIG. 4-1

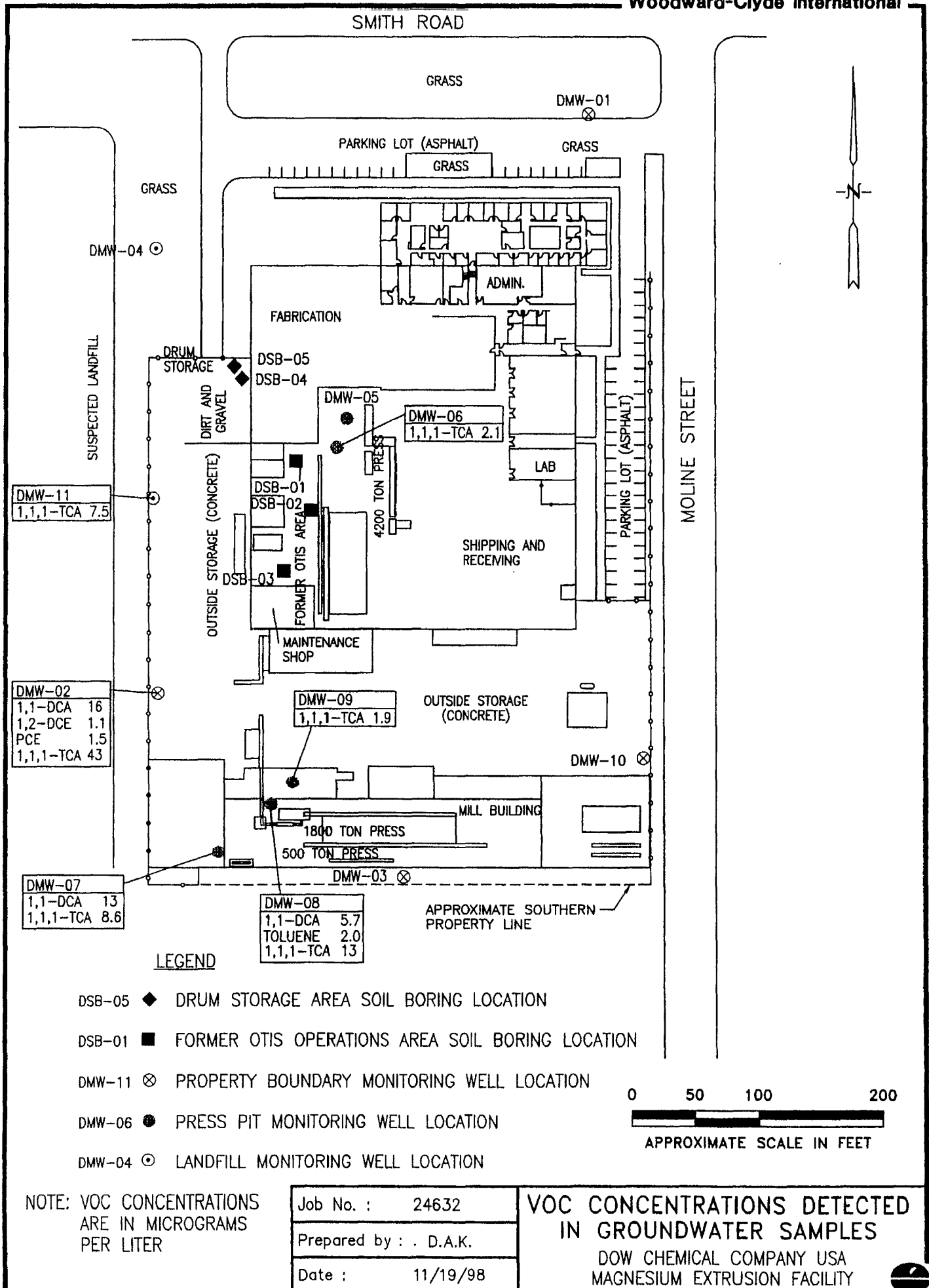


FIG. 4-2

SECTION FIVE Comparison of Analytical Results to Regulatory Standards and Goals

Organic compounds and metals detected in samples collected and analyzed during the Phase II investigation were compared to the applicable chemical-specific standards or proposed cleanup levels. This screening-level comparison was done to assess whether remedial action may be necessary for detected organic compounds and metals.

5.1 SOIL

For VOCs and metals in soil, the EPA Region III Risk-Based Concentrations (Preliminary Remediation Goals [PRG]) and the Colorado Department of Public Health and Environment, Proposed Soil Remediation Objectives Policy Document, Soil Cleanup Standards were used (Tables 4-1 and 4-2).

Based on a review of the data, none of the VOCs detected exceed EPA Region III risk-based concentrations for ingestion of soil at industrial or residential sites, nor any of the proposed Colorado soil cleanup standards for industrial land use, residential land use, and for protection of groundwater.

For metals detected in the soil samples, arsenic, beryllium, and thallium exceeded screening levels (i.e., either EPA Region III risk-based concentrations for ingestion of soil at industrial or residential sites, or one of the proposed Colorado soil cleanup standards for industrial land use, residential land use, and for protection of groundwater).

Arsenic, detected in all 14 soil samples at concentrations ranging from 1.2 to 4.1 mg/kg, exceeded the Colorado proposed soil cleanup standards for industrial land use (0.82 mg/kg), commercial land use (1.04 mg/kg), and residential land use (0.21 mg/kg). However, arsenic concentrations did not exceed published background levels (Table 4-2).

Beryllium, detected in the one surface soil sample and in 12 of 13 subsurface soil samples, at concentrations ranging from 0.24 to 1.2 mg/kg, exceeded the EPA Region III risk-based concentration of 0.15 mg/kg for ingestion of soil at residential sites but did not exceed levels for industrial sites. Since beryllium was detected in soil borings and monitoring well soil borings located upgradient and downgradient of the press pits and at the property boundaries and concentrations were within published background ranges, this metal is considered to be naturally occurring at these concentrations and not related to site contamination.

Thallium, detected in 2 of 13 subsurface soil samples, at concentrations of 1.1 and 1.3 mg/kg, exceeded the EPA Region III PRG of 0.0 mg/kg for ingestion of soil at industrial and residential sites. Both of these concentrations (1.3 mg/kg in soil boring DSB-01 at 4 to 6 feet bgs and 1.1 mg/kg in soil boring DSB-03 at 2 to 4 feet bgs) are at or very close to the reporting limit of 1.1 mg/kg. Additionally, no information was available on background ranges for this metal.

5.2 GROUNDWATER

For VOCs and metals, the EPA Primary and Secondary Drinking Water Maximum Contaminant Levels (MCLs) and the Colorado Groundwater Standards were used (Tables 4-3 and 4-4). Based on a review of the data, none of the VOCs detected exceed either EPA or Colorado groundwater drinking water standards.

SECTION FIVE Comparison of Analytical Results to Regulatory Standards and Goals

For metals detected in the groundwater samples, antimony, manganese, and selenium exceeded screening levels (i.e., either EPA or Colorado Drinking Water Standards).

Antimony, detected in monitoring well DMW-03 at a concentration of 0.072 mg/l, exceeded the EPA groundwater drinking water standard of 0.006 mg/l. Since monitoring well DMW-03 is upgradient along the southern property boundary, the presence of antimony does not appear to be site related.

Manganese, detected in all groundwater samples at concentrations ranging from 0.016 to 0.26 mg/l, exceeded the EPA secondary and Colorado groundwater standard of 0.05 mg/l (in 11 of 14 samples). However, since manganese was detected in all monitoring well groundwater samples located upgradient and downgradient of the press pits and the property boundaries, it is considered to be naturally occurring at these concentrations and not related to site activities.

Selenium, detected in all 14 groundwater samples at concentrations ranging from 0.03 to 0.057 mg/l, exceeded the more stringent Colorado groundwater standard of 0.01 mg/l (4 of 14 samples exceeded the EPA drinking water standard of 0.05 mg/l). Selenium was detected in all soil boring and monitoring well groundwater samples located upgradient and downgradient of the press pits and the property boundaries. Additionally, concentrations, in many cases, were higher at upgradient well locations compared to locations immediately downgradient of the press pits and other areas of interest. Therefore, this metal is considered to be naturally occurring at these concentrations and does not appear to be related to site activities.

A Phase II investigation was conducted for the Dow Magnesium Extrusion Facility in Aurora, Colorado from April to May 1998. Conclusions based on information obtained during the Phase II investigation are presented below.

Soil

- Chloroethane (14 µg/kg), 1,1-DCA (110 µg/kg), PCE (8.2 µg/kg), 1,1,1-TCA (26 µg/kg), and xylenes (10 µg/kg) were detected in the subsurface soil sample collected at 3 feet bgs in DMW-08, suggesting a possible release of solvents at the 1800-ton press.
- TRPH was detected at concentrations of 2970 mg/kg (3 feet bgs) and 2700 mg/kg (12 feet bgs) in boring DMW-08. TRPH was also detected at a concentration of 974 mg/kg in a surface sample collected in boring DSB-05.
- No VOCs, or SVOCs were detected in soil samples collected from DSB-04 and DSB-05.
- No VOCs, SVOCs, or petroleum hydrocarbons were detected in soil samples collected from DMW-04 and DMW-11, suggesting that the adjacent, offsite, landfill has not impacted soil on site.
- Although there are no promulgated standards for soil cleanup in Colorado, action levels have recently been proposed by CDPHE. Volatile organics found in soil at the Dow facility did not exceed proposed Colorado standards or US EPA Region III PRGs for soil ingestion.
- Concentrations of several metals in soil (i.e., arsenic, beryllium, and thallium) exceeded US EPA Region III PRGs or proposed Colorado standards for soil. However, the concentrations detected in soil at the Dow facility appear to be within background levels published by the US Geological Survey (except for thallium for which no published data could be found).

Groundwater

- Eleven groundwater monitoring wells were installed and sampled to evaluate groundwater quality at the site. Well screens were placed from the top of the bedrock surface to between 4 and 8 feet above the measured water level at time of drilling. This was done to detect any solvents (dense non-aqueous phase liquid [DNAPL]) which tend to sink to the bottom of the water bearing zone or petroleum hydrocarbons (light non-aqueous phase liquids [LNAPL]) which tend to float on the water surface. Neither DNAPL or LNAPL were present in the wells installed and sampled during the Phase II investigation. Furthermore, the low VOC concentrations are well below solubility concentrations supporting the conclusion that DNAPLs are not present at the site.
- No VOCs, SVOCs, or petroleum hydrocarbons were detected in the groundwater samples from upgradient wells DMW-01, DMW-03, and DMW-10, indicating that contaminants are not migrating on to the property from off-site sources at this time.
- 1,1-DCA (16 µg/l), 1,2-DCE (1.1 µg/l), PCE (1.5 µg/l), and 1,1,1-TCA (43 µg/l) were detected in the groundwater sample from DMW-02, located along the western property boundary, downgradient of the 1800-ton press pit. These data suggest that a release of solvents used at this press has occurred.

- 1,1,1-TCA (2.1 µg/l) was detected in the groundwater sample from DMW-06; 1,1-DCA (13 µg/l) and 1,1,1-TCA (8.6 µg/l) were detected in the groundwater sample from DMW-07; 1,1-DCA (5.7 µg/l), toluene (2.0 µg/l), and 1,1,1-TCA (13 µg/l) were detected in the groundwater sample from DMW-08; 1,1,1-TCA (1.9 µg/l) was detected in the groundwater sample from DMW-09. These data suggest that a release of solvents, likely at the 1,800-ton press, has impacted groundwater.
- Volatile organics found in groundwater at the site did not exceed US EPA drinking water standards (i.e., MCLs) established under the Safe Drinking Water Act or the State of Colorado Groundwater Standards (5 CCR 1002-42) promulgated under the Colorado Water Quality Control Act.
- Metals in groundwater at the site exceeding the standards presented above appear to be within background ranges. Concentrations which exceeded standards were found at similar levels in both upgradient and downgradient wells and in one case was only detected in an upgradient well.

**PHASE II ENVIRONMENTAL SITE ASSESSMENT
TIMMINCO LIMITED
11380 SMITH STREET
AURORA, COLORADO**

1 INTRODUCTION

Walsh Environmental Scientists and Engineers, LLC (WALSH) has completed a Phase II Environmental Site Assessment (ESA) at the Timminco magnesium extrusion facility located at 11380 Smith Road in Aurora, Colorado (the "site"). This Phase II ESA was an investigation for Timminco Limited (Client) as part of a property relinquishment by the Client. The Client requested the scope of the Phase II ESA mirror a previous Phase II ESA completed by URS Greiner Woodward Clyde (URS Greiner Woodward Clyde, January 1999), which addressed potential Recognized Environmental Concerns (RECs) identified at and in the vicinity of the Site. Field activities included drilling soil borings and temporary monitoring wells to facilitate soil and groundwater sample collection. A site map with URS and WALSH boring and well locations is presented on Figure 1.

The site consists of approximately five acres of land, an office space, and two manufacturing buildings (fabrication and extrusion buildings) with a surrounding storage yard. The entire property has been developed for current operations at the Site. The facility is located in an industrially zoned area. The land use around the facility is of commercial and light industrial nature. Located to the west are two Colorado Department of Corrections facilities. To the south is a distribution facility and to the east, across Moline Avenue are several local businesses and warehouses. To the north, across Smith Road is a railroad right-of-way with a Frito-Lay facility beyond the railroad tracks.

Dow originally constructed the facility in 1969 and has since relinquished it to Timminco. The original building constructed in 1969 was the extrusion building. In 1972, the original machine shop was constructed. Beginning in the mid-1970s, the machine shop was leased to Otis Elevator for use as an engineering and fabrication facility. Dow took back the original machine shop in 1986 and converted it to administrative offices and the fabrication building.

The magnesium extrusion facility processed approximately 15 million pounds of magnesium per year. The manufacturing activities occurred within both buildings at the site. Raw materials consisting of magnesium ingots and billets were brought in by truck and rail car and stored in the yard area or in the warehouse area. Seventeen inch diameter ingots were extruded through the 4,200 ton press to form 7-inch, 8-inch, or 9-inch diameter poles. These poles were then cut into billets. The billets were extruded through the 1,800-ton press into various shapes and profiles. These shapes or profiles were shipped directly to the customer or may have been sent to fabrication for further processing.

Fabrication included processes such as machining and the installation of caps and other plastic components. All machining at the facility consisted of dry machining. Since 1999, no cutting fluids were used at the facility. Products were shipped to customers or distribution sites on common carrier trucks or customer-owned trucks.

The Phase II ESA assesses potential recognized environmental conditions that were evaluated in the previous Phase II ESA (URS Greiner Woodward Clyde, January 1999). Those findings of the 1999 investigation not subject to change (geology, hydrogeology etc;) have been incorporated into the current investigation. The client requested the Phase II to update the 1999 investigation and include the same scope of work. The following is a summary and rationale of completed field activities to address potential environmental concerns at the Site:

- **Property Boundary:** Three borings/wells (WMW-1, WMW-2, WMW-6) were completed to determine boundary conditions by sampling of soil and groundwater. Borings were completed at the same locations as the 1999 investigation including two downgradient locations along the north parking lot, plus one boring northeast of the mill building. One proposed boring/well (WMW-5) in the vicinity of former URS well DMW-08, was not completed due to the presence of unstable terrain and unmarked underground utilities.
- **Extrusion Press Pits:** Five borings/wells (WMW-7 through WMW-11) were completed to investigate possible releases from the press pits including two at the 4,200-ton press in the main building, two at the 1,800-ton press in the mill and one at the 500-ton press in the mill building.
- **Landfill:** Two borings/wells (WMW-3 and WMW-4) were installed along the western property line to investigate any impact from the closed landfill on the adjacent Colorado Department of Corrections property.
- **Drum Storage Area:** Two soil borings (WSB-1 and WSB-2) were installed in the drum storage area to assess any impact from hydraulic or waste oil releases.

2 SUMMARY OF FIELD ACTIVITIES

2.1 Soil Sampling Methodologies

During July 16, 17 and 21, 2009, ten monitoring wells (WMW-1 through WMW-4, and WMW-6 through WMW-11) and two soil borings (WSB-1 and WSB-2) were completed to assess recognized environmental conditions that were evaluated in the previous Phase II ESA (URS Greiner Woodward Clyde, January 1999). A site map depicting previous and current soil boring/well locations is presented as Figure 1, Appendix A.

4 CONCLUSIONS

During the July 16, 17 and 21, 2009 Phase II ESA, lithology encountered generally consisted of sandy, clayey fill material ranging in depth from 0 feet bgs to 1 feet bgs, gravelly silty sand with intermittent silty clay lenses ranging in depth from 1 feet bgs to 32 feet bgs. Field screening results of soil samples did not detect the presence of VOCs in the samples collected from any of the soil borings. The depth to encountered groundwater ranged from 14.20 ft bgs to 26.26 ft bgs. Groundwater flow direction in the shallow aquifer is towards the northwest.

Water quality parameters including temperature, conductivity and pH to evaluate chemical composition of groundwater at the Site did not indicate anomalies other than a slightly elevated pH of 9.80 in well WMW-1. Based on field observations and quantitative analysis of soil samples collected from soil borings, all VOCs were below the CDPHE CSEVs.

SVOC soil analyses also did not indicate the presence of any COC above the CDPHE CSEVs.

Laboratory analytical results for soil metals analyses indicated arsenic was detected exceeding the CSEVs in soil samples collected from soil borings WMW-3, WMW-4, WMW-6 through WMW-11 at concentrations ranging from 2.3 mg/kg (WMW-8) to 4.5 mg/kg (WMW-3). However, the concentrations of arsenic at all locations were well within the normal background range for soils in the Colorado Front Range Urban Corridor and were below common cleanup goals established by CDPHE. The remaining COCs were either below the CSEV or below the laboratory MDLs.

Laboratory analytical results for TPH (oil & grease) soil analysis indicated the presence of petroleum in one sample (WMW-9) at a concentration of 700 mg/kg. This sample exceeded the OPS TPH threshold value of 500 mg/kg for triggering PAH analysis. A TPH threshold value is to identify sites where priority PAHs may pose a risk to human health and the environment. However, no PAHs were detected in this sample above CSEVs.

Analytical results for VOC groundwater analysis did not indicate the presence of COCs exceeding the DWS. Groundwater in the shallow aquifer beneath the Site is not used as a source for drinking water. The Site and surrounding properties were developed in a industrial setting.

Laboratory analytical results for SVOCs analysis of groundwater samples indicated bis (2-ethylhexyl) phthalate in WMW-10 exceeding the DWS but was also detected in the QC Method Blank for this sample. Bis (2-ethylhexyl) phthalate, is most widely used as a plasticizer for poly (vinyl chloride) (PVC) and other plastics. Bis (2-ethylhexyl) phthalate is ubiquitous in the urban environment and is also found in environmental sampling and laboratory equipment. Because it is so common and Timminco is not a known source, it most likely originated from plastic sampling or laboratory equipment. It is not believed to be a site contaminant and does not pose an environmental concern to the property.

Analytical results for dissolved metals in groundwater did not indicate the presence of COCs exceeding the DWS.

Laboratory analytical results for TPH – oil & grease in groundwater detected these COCs in samples collected from well WMW-9 at a concentration 56 mg/L (WMW-9D). There is no DWS for TPH.

Based on the findings of this investigation, no additional investigation is recommended. The arsenic detected in the soil samples exceeding the CSEV are unlikely to adversely affect the environmental quality of the Site and appear to be naturally occurring metal concentrations. The TPH appears to be confined to soil beneath the manufacturing building, did not contain PAHs above CSEVs and does not appear to impact groundwater. The COCs exceeding the DWS appear to be artifacts of this investigation (lab and drilling), but are not expected to pose a risk to human health since the shallow water aquifer beneath the Site is not used for drinking water.

5 LIMITATIONS

The conclusions presented in this report were developed from the review of information developed during the site investigation, field observations, measurements, and laboratory analyses.

Physical constraints, such as equipment, underground utilities, soil banking, unstable surface conditions and property boundaries limited soil probing activities to around the perimeter of the building and to the south side of the Site.

Subsurface conditions may vary at locations and times other than those tested, and practicality prohibits the investigation of all soil and groundwater. If additional information concerning site environmental conditions becomes available, the conclusions presented in this report will not be considered valid unless this information is reviewed and the conclusions of this report are modified and approved in writing by WALSH.

6 REFERENCES

Agency for Toxic Substances and Disease Registry (ATSDR). 1992. Toxicological profile for bis (2-ethylhexyl) phthalate. Atlanta, GA: U.S. Department of Health and Human Services, Public Health Service.

Agency for Toxic Substances and Disease Registry (ATSDR). 1992. Toxicological profile for chrysene. Atlanta, GA: U.S. Department of Health and Human Services, Public Health Service.